

# THE MANUFACTURE OF CONFECTIONERY

ROBERT WHYMPER

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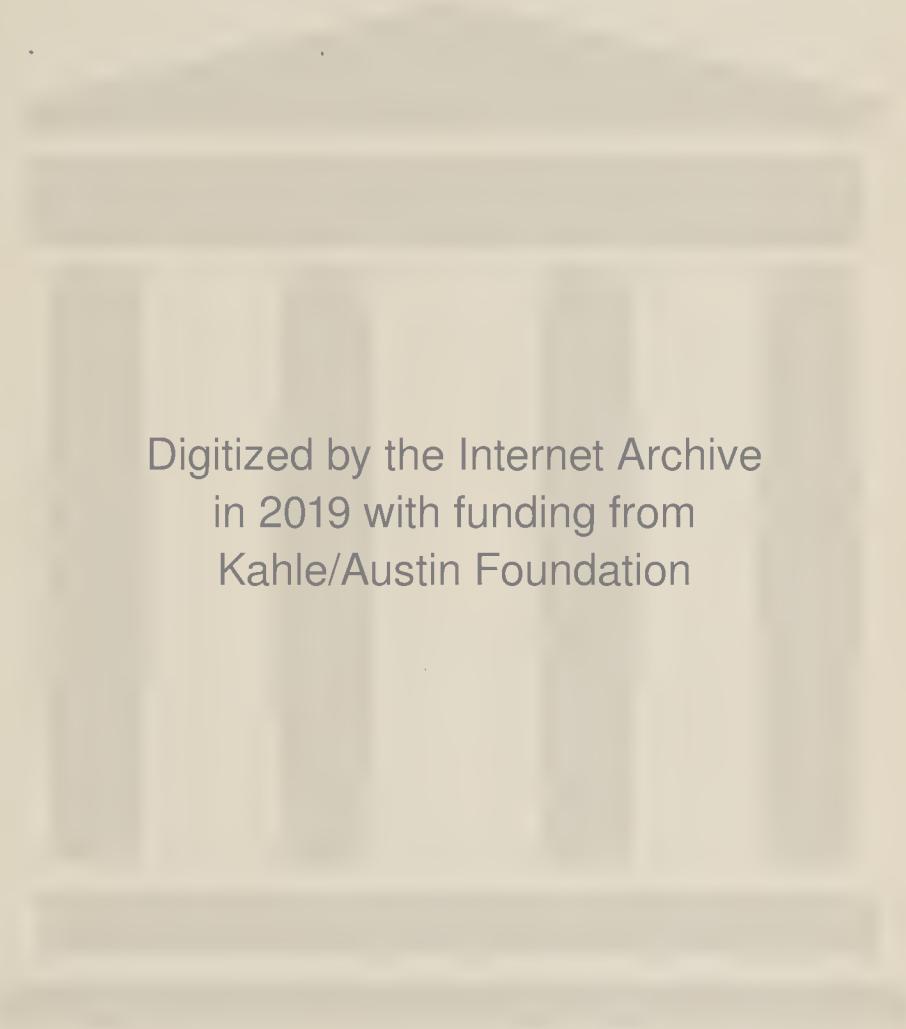


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# THE MANUFACTURE OF CONFECTIONERY



# THE MANUFACTURE OF CONFECTIONERY

BASED UPON JACOUTOT'S WELL KNOWN WORK

Rewritten, enlarged and edited by  
**ROBERT WHYMPER**  
(*Author of "Cocoa & Chocolate"*)

Jacoutot, Auguste  
...  
...

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## EDITOR'S PREFATORY NOTE

THOUGH no one has ever been known to read the preface to a technical book, the present occasion demands some explanation, if only for the purpose of protecting myself against the fanatical devotee of Jacquotot. I have so often, in my capacities as chemical adviser and lecturer on foodstuffs, been asked for a reliable book on Confectionery. So far, I have always recommended "Jacquotot," because it is the only work on the subject, to my knowledge, which provides information in such a form that it can be applied both by the novice and experienced worker in confectionery—and that is a great deal to say about any technical book.

When the opportunity arose to revise "Jacquotot," I was dubious as to whether any alteration, except in its arrangement, were desirable, but, later, I realised that the successful methods of Jacquotot in the first edition could be greatly enhanced by a preliminary discussion on the principles involved in the manufacture of confectionery. No book on such a subject should be only a catalogue of recipes—we all know the books of this kind on the market and the curious concoctions resulting from an attempt to follow the recipes accurately. Indeed, it would be absurd to expect that any two persons out of ten, working on the same recipe, would get results in any way comparable, unless the methods and materials, employed, were precisely similar in each case. But if the principles of sugar-boiling and confectionery-manufacture generally are understood, then the recipes serve as a guide and may provide new ideas for the production of a confection of a novel character.

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The great variations in the ingredients, the machinery and the methods of manufacture make the simple recipe book of very little value to the confectioner, and, in the present work, I wish to emphasize that the recipes, alone, without an understanding of the principles involved, may reasonably be placed in the same category as those to be found in an ordinary recipe book. Yet, both from practice and hearsay, I can assert that the recipes in Jacoutot's first edition were far superior to those to be found elsewhere. Consequently, I have included as many as possible of the original formulæ, whilst I have added yet others of tried worth. It may be that some of the new recipes may be recognised by their inventors or publishers—in which case I beg them to accept my thanks, on the one hand, for their valuable contributions, and my apologies, on the other, for not having acknowledged them by name, for, indeed, it is impossible to say where the thousands of recipes, collected over many years, really originated.

With regard to the principles of confectionery-manufacture, outlined in the first part of the book, I am aware that it has been treated rather from a chemico-scientific standpoint than from that of an engineer. That is because I am a chemist ! Were I an Unwin, I should dilate at greater length upon the super-excellence of the gears and clutches of the Enrober, or, if I had been a Callendar, I should have called for expansion on the beauties of the evaporation-efficiency of the Baker Continuous Cooker, but, even with this acknowledged narrowness of vision, I believe that I have provided the confectioner with what he wants to know.

I am, in all probability, the person most conscious of the shortcomings of the present work—for instance, too little has been said on the preparation of colours and essences—but it has been the aim and object to produce a book at a reasonable price, a none too easy task in these days of high costs of printing and binding. I should have liked, too, to have given in greater detail many processes of manufacture,

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but the main purpose of providing a cheap, useful, standard work for the confectioner outweighed my desires for greater elaboration.

The task of re-editing a work of this kind is not a light one, and is essentially thankless in this particular case, seeing that "Jacoutot" gained adherents because it was good at the first edition, and any improvements, made from my point of view, are open to destructive criticism. By leaving intact most of the outstanding features of the original work, and by adding only such matter as seemed essential, I have the consolation that here is old, well-matured wine that I am placing in a new bottle — direct antithesis to the Biblical proverb, from the performance of which I might reasonably expect a nasty mess.

I have, moreover, received very great assistance from Messrs. Joseph Baker Sons & Perkins Ltd., in preparing this new edition for the press, not the least being permission to illustrate this work with reproductions of their excellent machines. To this progressive firm I am anxious to extend my warmest thanks.

Finally, curious and courteous reader, it is said that "the road to hell is paved with good intentions." I trust that you will not find my earnest endeavours laying the way *only* to that place. If faults you find, as faults there be, you must place them on the head, not of Auguste Jacoutot, but of his admirer and your well-wisher,

R. WHYMPER.

London, 1923.

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# PRINCIPLES OF SUGAR-BOILING

## Chapter I.

*Sugar-boiling and its Principles—Machinery employed in the manufacture of Hard-boiled Goods—Machinery employed in the manufacture of Fondant—Machinery employed in the manufacture of Preserved Fruits and Jams.*

### SUGAR-BOILING AND ITS PRINCIPLES.

SINCE confectionery could not exist without sugar in some form or other, it is reasonable that the principal ingredient of all confections should be considered at the outset.

The most common sugar employed is known scientifically as "sucrose" (chemical formula  $C_{12}H_{22}O_{11}$ ), popularly as "cane sugar," and technically as just "sugar." It is important to note that from whatever source derived, cane, beet, sorghum, date, palmyra, maple, etc., the purified sucrose is always of the same composition and of the same sweetness. It is only in the presence of its natural impurities, found in the crude or raw sugars, that the flavour and sweetness of the different varieties of commercial sugar are found to vary. This consideration is of far greater importance to the confectioner than is usually realised, the intensity of sweetness and the agreeable flavour of a finished sweetmeat being often capable of modification or improvement by careful selection of the sugar employed. Sucrose, or the crystal sugar of commerce, usually appears on the market as anhydrous, bright monoclinic crystals with a specific gravity of 1.581 at 15°C. The best granulated sugar is in this form, and the most perfect commercial crystals are seen in "coffee sugar" or "centrifugals."

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Large crystals, on the other hand, as for instance, "sugar candy," which have crystallised out slowly from hot concentrated solutions, are formed by a combination of parallel-disposed plates or layers which often enclose a certain quantity of the mother-liquor, causing some degree of colouration. Generally speaking, the purer the sugar solution and the slower the crystallisation, the larger the crystals of sugar formed. Very rapid crystallisation from raw sugar solutions or from solutions of sugar with a relatively large amount of foreign bodies such as salts, gums, etc. is liable to result in a yield of small sugar crystals. In confectionery, with the exception in the highest degree in sugar candy,

TABLE I.

SOLUBILITY OF SUCROSE IN WATER AT DIFFERENT TEMPERATURES.

Temp. °C.	Per cent. of Sucrose.								
0	64.18	14	66.18	28	68.37	42	70.78	56	73.39
1	64.30	15	66.33	29	68.53	43	70.96	57	73.58
2	64.45	16	66.48	30	68.70	44	71.14	58	73.78
3	64.59	17	66.63	31	68.87	45	71.32	59	73.98
4	64.73	18	66.78	32	69.04	46	71.50	60	74.18
5	64.87	19	66.93	33	69.21	47	71.68	61	74.38
6	65.01	20	67.09	34	69.38	48	71.87	62	74.58
7	65.15	21	67.25	35	69.55	49	72.06	63	74.78
8	65.29	22	67.41	36	69.72	50	72.25	64	74.98
9	65.43	23	67.57	37	69.89	51	72.44	65	75.18
10	65.58	24	67.73	38	70.06	52	72.63	66	75.38
11	65.73	25	67.89	39	70.24	53	72.82	67	75.59
12	65.88	26	68.05	40	70.42	54	73.01	68	75.80
13	66.03	27	68.21	41	70.60	55	73.20	69	76.01

and in a minor degree in "crystallising" fondants, fruits, etc., advantage is taken of this power of forming small crystals in impure or "semi-cut" sugar solutions (when the formation of invert sugar is encouraged) in the preparation of many confections. This aspect is considered more fully later in this chapter.

Sugar solutions that have been allowed to become super-

## PROPERTIES OF SUGAR SOLUTIONS

saturated by elevation of temperature, or by addition of excess of sugar, will suddenly deposit very minute, mealy crystals if the whole is quickly stirred. Use is again made of this characteristic in the preparation of "amorphous" or "transformed" sugar, which is eminently suitable for the manufacture of chocolate, also discussed more fully in its proper place.

The degree of solubility of sucrose in water at different temperatures is shown in the first Table.

The specific gravities of pure sugar solutions are often of great value to the confectioner. These are shown in Table II. (*vide* also Appendix II.)

TABLE II.

### SPECIFIC GRAVITIES OF SUCROSE SOLUTIONS.

Per cent.	Specific Gravity.	Per cent.	Specific Gravity.	Per cent.	Specific Gravity.
1	1.00388	23	1.09686	45	1.20565
2	1.00779	24	1.10145	46	1.21100
3	1.01173	25	1.10607	47	1.21639
4	1.01570	26	1.11072	48	1.22182
5	1.01970	27	1.11541	49	1.22728
6	1.02373	28	1.12013	50	1.23278
7	1.02779	29	1.12488	51	1.23832
8	1.03187	30	1.12967	52	1.24390
9	1.03599	31	1.13449	53	1.24951
10	1.04014	32	1.13934	54	1.25571
11	1.04431	33	1.14423	55	1.26086
12	1.04852	34	1.14915	56	1.26658
13	1.05276	35	1.15411	57	1.27235
14	1.05703	36	1.15911	58	1.27816
15	1.06133	37	1.16413	59	1.28400
16	1.06566	38	1.16920	60	1.28989
17	1.07002	39	1.17430	61	1.29581
18	1.07441	40	1.17934	62	1.30177
19	1.07884	41	1.18460	63	1.30777
20	1.08329	42	1.18981	64	1.31381
21	1.08778	43	1.19505	65	1.31989
22	1.09231	44	1.20033	66	1.32601

The boiling-points of sucrose solutions of different concentrations at ordinary atmospheric pressure are next shown.

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TABLE III.

BOILING POINTS OF SUCROSE SOLUTIONS OF DIFFERENT CONCENTRATIONS.

Per cent. Sucrose	10	20	30	40	50	60	70	80	90.8
Temperature (°C)	100.4	100.6	101.0	101.5	102.0	103.0	106.5	112.0	130.0

The changes in viscosity of sucrose solutions both with concentration and temperature are of importance and interest to the confectioner. These figures can be found among Claasen's well-known works (*Zeitsch. Rubensuckerind.*, xlvi. 535) by those desirous of further information. Sufficient for the moment to say that the viscosity of sucrose solutions of increasing concentration at increasing temperature shows a much more marked decrease by the rise in temperature than an increase by reason of higher concentration. It should be noted that impure sugar solutions, treacles and molasses, containing generally more foreign bodies than plain sucrose solutions, though following the same viscosity rules, are subject to certain variations according to the impurity present. Thus sodium salts increase the viscosity more than potassium salts, and calcium salts more than sodium salts. Of all the substances, tried by Claasen, when added to a 65 per cent. solution of sucrose and glucose, gum was the only one that actually caused an increase of viscosity, a fact which at first seems somewhat remarkable when it is remembered that pure sucrose syrups are much less viscous than impure ones. On the other hand, a pure sucrose solution contains a maximum of 68 per cent. of dry substances, whilst molasses can contain up to 85 per cent. of solids, which most certainly accounts for this apparent anomaly.

A pure, dry sucrose may be heated for a considerable time above 100° C., or melted at 160° C., without suffering decomposition. The presence of very small traces of water, how-

## PROPERTIES OF SUGAR SOLUTIONS

ever, renders sucrose liable to decomposition at temperatures but slightly above that of boiling water. When heated at its melting-point for long periods, sucrose undergoes decomposition into a mixture of glucose and lævulosan, whilst, at a still higher temperature, the sucrose loses water and becomes caramelised. A further rise in temperature results in the production of carbon dioxide, formic acid, acetone, furfural, etc., and a carbon which, if the sugar were pure at the outset, will burn away without leaving any ash.

Sucrose solutions on continuous heating or, with increased rapidity, under the action of pressure as well as heat, invert, *i.e.*, change into a mixture of dextrose (glucose) and lævulose (fructose) in equal proportions. In the presence of live steam, sucrose solutions are rapidly decomposed before  $130^{\circ}$  C. is reached, the maximum rate of decomposition (into carbon dioxide, formic, and acetic acids, etc., besides glucose and fructose) taking place between  $110^{\circ}$  C. and  $120^{\circ}$  C. Superheated steam also breaks down sucrose; at  $160^{\circ}$  C. similar decomposition products, as above, are formed, and, at  $280^{\circ}$  C., the sugar is reduced to carbon dioxide, formic acid, etc., with several empyreumatic substances such as furfural.

The action of dilute mineral acids, or of tartaric, phosphoric acids and certain acid-salts such as cream of tartar, on sugar solutions is of utmost importance to the confectioner. Inversion, or the breaking down, of sucrose into glucose and fructose takes place in the presence of acid substances according to the chemical equation:—



The similarity of the chemical formulæ of glucose and fructose need not be discussed here, for all the confectioner requires to know is that 95 parts of sucrose combine with 5 parts of water to form 100 parts of invert sugar.

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The speed of inversion or the invertive activity of the different acids varies considerably. Thus, if the rate of inversion by hydrochloric acid be taken as 100, the following table shows the rates of inversion of several of the common and naturally occurring acids, whether prepared in the chemical factory or actually present in different fruits.

TABLE IV.

### RATES OF INVERSION OF SUCROSE SOLUTION BY DIFFERENT COMMON AND NATURALLY OCCURRING ACIDS.

Acid.		Rate of Inversion.
Hydrobromic acid	..	111.40
Hydrochloric (Muriatic acid)	..	100.00
Nitric acid	..	100.00
Sulphuric ,,	..	53.60
Sulphurous ,,	..	30.40
Oxalic ,,	..	18.57
Phosphoric ,,	..	6.21
Tartaric ,,	..	3.08
Citric ,,	..	1.72
Formic ,,	..	1.53
Malic ,,	..	1.27
Lactic ,,	..	1.07
Succinic ,,	..	0.545
Acetic ,,	..	0.400

A brief consideration of these figures will quickly demonstrate why hydrochloric, sulphurous, phosphoric, tartaric and acetic acids are principally used in confectionery, the price, the speed of action required, and the safety in use in food-stuff manufacture determining which of the acids should be employed.

The confectioner should never forget that a sucrose solution inverts on standing if acid is present, the more rapidly the hotter the solution. Acid sugar solutions should, therefore, be worked up quickly and should not be left for long periods, such as over the dinner-hour, if over-inversion is to be avoided.

## SUGAR-BOILING

### SUGAR-BOILING.

The boiling-points of sucrose solutions of various concentrations have already been given. The confectioner requires to know, however, not only the boiling-points of solutions of various strengths but also the exact degree to which he must boil in order to secure the desired effect. The wise, modern confectioner boils to the thermometer or "glass," the "old hand" to his finger. For the benefit of both, the following conversion table of technical into scientific readings is given:—

Technical Term.	Temperature by Thermometer.	
	C.	F.
Pearl .. .. .. .. ..	104.4	220
Blown or Double Thread .. ..	115.5	240
Feather .. .. .. ..	116.7	242
Ball (large) .. .. .. ..	121.1	250
Crack (hard) .. .. .. ..	138.3	281
Caramel .. .. .. ..	182.2	360

These figures, of course, apply to pure sucrose, but they are, for all practical purposes, applicable to confectioners' sugar, granulated sugar, etc.

If the sugar solutions contain impurities such as invert sugar, acids, salts, confectioners' glucose, etc., the effect may be to alter the temperature of the "pearl," "blown," "feather," "ball" or "crack." That the presence of even quite small quantities of reducing sugars, such as glucose, has material effect upon the crystallising degree of sugar solutions, is shown in the next Table.

The significance of these figures is best seen in practice when fondants, fruits, etc., are being crystallised in a saturated sugar solution. For this purpose the sugar must be as pure

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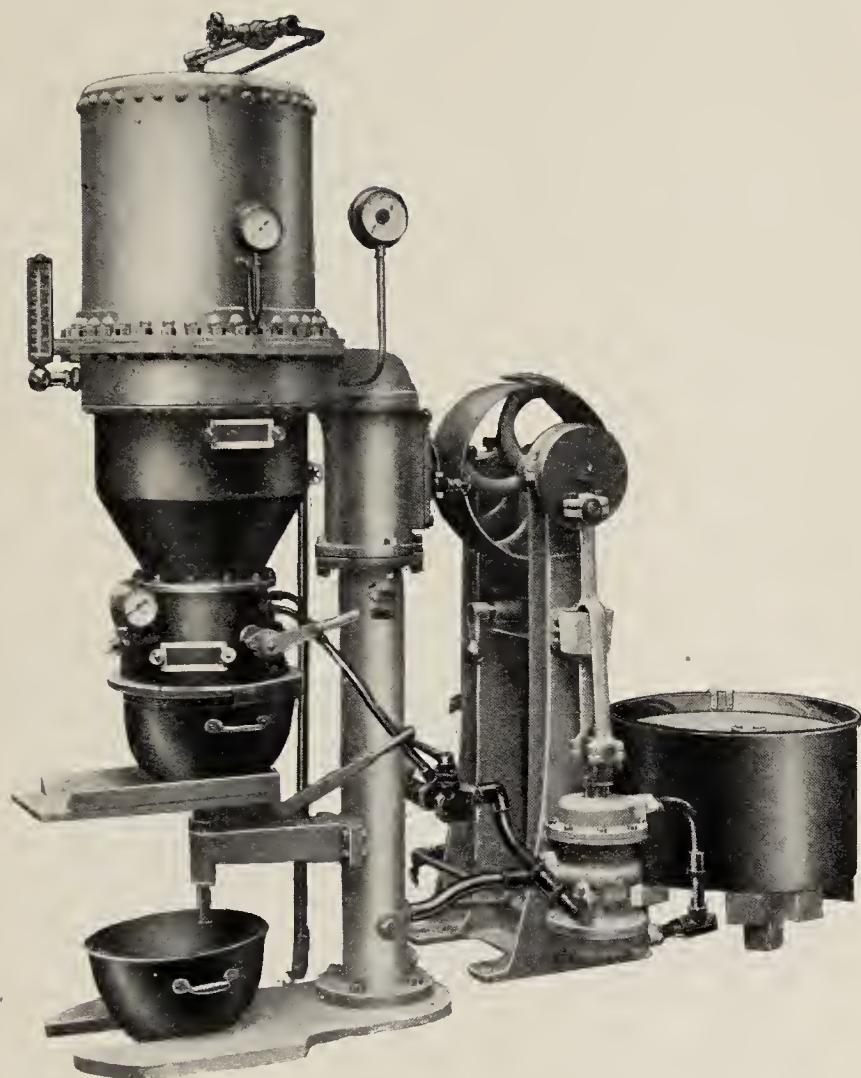
TABLE V.

EFFECT OF REDUCING SUGARS ON THE POWER OF CRYSTALLISING OF CANE SUGAR FROM SOLUTIONS.

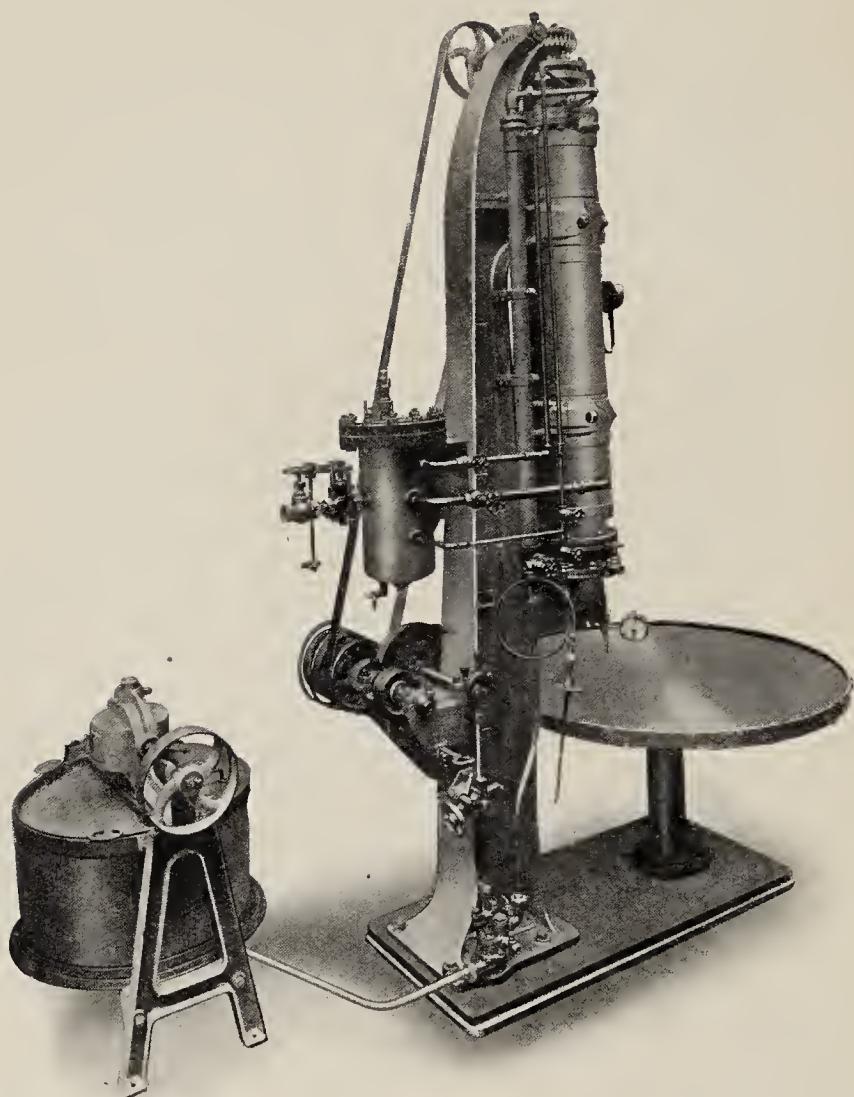
No.	Brix.	Polarization.	Reducing sugars.	Water.	Quotient of Purity.	Glucose ratio.	Sucrose on 100 water.	Sucrose crystallised out on 100 Masse-Cuite at 45° C.
1	79.21	71.70	3.34	21.59	90.52	4.66	332.1	19.52
2	80.32	72.23	3.63	20.88	89.93	5.07	345.9	22.26
3	79.73	69.00	5.16	21.27	89.65	6.25	325.8	17.59
4	77.65	70.81	3.97	23.65	89.17	5.57	299.4	13.65
5	78.43	71.11	3.91	22.67	88.68	5.60	326.9	16.32
6	80.62	71.55	3.99	20.08	88.62	5.58	356.3	23.02
7	81.72	71.87	5.04	19.58	87.95	7.01	367.1	24.55
8	78.59	68.95	4.52	22.61	87.45	7.14	304.9	14.30
9	83.11	72.48	3.40	17.99	87.21	4.7	402.9	29.00
10	79.26	69.00	5.16	21.74	87.06	7.48	317.4	16.45
11	78.47	67.49	4.82	22.72	87.04	7.14	297.0	12.55
12	83.50	72.52	4.18	17.40	86.85	5.76	417.8	30.46
13	78.51	68.15	5.59	22.39	86.81	8.2	304.4	14.03
14	79.55	67.54	5.64	21.45	84.89	8.35	314.9	15.70
15	79.75	66.49	6.71	21.49	83.37	10.09	309.4	14.55
16	75.95	63.14	7.60	25.19	83.13	12.0	250.6	5.61
17	79.10	65.67	3.85	21.60	83.02	5.86	304.0	13.47
18	81.05	66.77	3.71	19.75	82.38	5.55	338.1	19.03
19	84.73	69.52	4.97	17.67	82.05	7.15	393.4	24.12
20	85.56	70.19	4.70	15.54	82.03	6.70	451.7	32.63
21	81.60	66.9	8.26	19.43	82.00	12.3	344.3	19.84
22	78.74	64.13	4.11	22.46	81.44	6.41	285.5	9.85
23	83.83	68.24	5.43	19.54	81.37	8.0	354.6	21.01
24	80.36	65.0	7.78	20.75	80.90	12.0	313.2	14.85
25	82.08	66.3	7.81	18.17	80.79	11.78	364.9	22.18
26	85.29	68.48	5.34	17.02	80.29	7.78	402.3	27.34
27	80.28	64.34	8.08	20.89	80.14	12.56	308.9	13.85
28	83.20	66.40	8.26	18.07	80.00	12.4	367.4	22.72
29	77.07	59.24	8.28	26.21	76.87	13.97	226.0	—
30	85.87	65.21	8.24	16.68	75.94	12.64	391.6	24.89

as possible, and, after it has been boiled up once or twice after successive crystallisations, the syrup tends to deposit upon the immersed goods small, dull crystals rather than the bright, sharp crystal-formation which is the aim of the confectioner. Especially is this so if the fruits have imparted any of their acid to the solution during their immersion whilst undergoing the process of crystallisation, when a considerable degree of inversion may have occurred.

Enough has been said to show that a knowledge of the



THE "EUREKA"  
VACUUM MACHINE



THE "BAKER" AUTOMATIC  
CONTINUOUS SUGAR COOKER

## MACHINES FOR HARD-BOILED GOODS

behaviour of sugar in solution is essential to the confectioner who looks to sugar-boiling for a variety of purposes, the chief of which are the manufacture of hard-boiled candies, fondants, crystallising-syrups, jams and jellies among other confections.

## MACHINES EMPLOYED IN THE MANUFACTURE OF HARD-BOILED GOODS OR HARD-BOILED ENGLISH DROPS.

The infinite variety of hard-boiled sugar confections makes this section of sugar-boiling of very great importance. The principles underlying sugar-boiling generally have been briefly considered, and in this place it is proposed to give practical working hints as to the nature of the equipment necessary to give the best results. Later, recipes for the production of articles of the highest excellence will be given.

The equipment required for the hard-boiling room will be :—

Stoves—coke or gas.

Large Steam-pans for melting.

Sugar-boilers—"Eureka" Vacuum Boilers, or "Baker" Automatic Cookers are the best.

Hot and Cold Metal Tables, or small Pouring Plates.

Drop-rollers.

Candy-pulling Machines.

Rock-candy Cutting Machines.

Special machines for special purposes.

The aim and object of the confectioner in preparing hard-boiled goods (unless butter-scotch and toffees are under consideration) is to obtain brilliance in colour and (or) transparency which will not dull readily on exposure to the air, and the most attractive flavour. The materials employed for ordinary fruit-drops and, indeed, for most hard-boiled goods,

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are sugar, confectioners' glucose, with or without acid (tartaric acid, etc., or cream of tartar), and fruit-flavours. The proposition before us is then, quite a straight one, and it is our object to secure a brilliantly glassy product of bright, clear colour and pleasant taste from sugar, glucose, with or without acid, and fruit-flavours only, the filled bon-bons being only elaborated confections of the same order.

Low temperatures, on the one hand, or very quick concentration of the sugar-syrup, on the other, are necessary to secure clear, brilliant and dry goods, especially in the presence of much glucose or if acid is used. The first great improvement in the manufacture of hard-boiled goods was the Vacuum Pan which assisted both these objects, but which has been entirely superseded by the so-called Vacuum Cookers and especially by the "Baker" Continuous Cooker.

The sugar and glucose are melted down in a Steam-pan situated close to the cooker, and the solution brought to 36° Baumé, care being taken not to boil too much. The syrup is then filtered through a fine sieve which, in the case of the Vacuum Cooker, is fitted over a copper reservoir, placed below the machine, and is then ready for cooking. It should be remembered that the finish of the goods depends much upon manipulation and that, therefore, the arrangement of the hard-boiling room should be considered carefully, the Steam-pans being within easy reach of the Cookers which in turn, should be handy to the tables and in close proximity to the Drop-rollers. Further, it should be remembered that dryness and brilliance depend upon the speed with which the process is carried through, the temperature and duration of cooking and the subsequent time of exposure of the cooling drops to the air, whilst the finest flavour can result only when the highest quality of essence or flavouring matter is used and added at the latest possible moment.

The ordinary Vacuum Pan is now completely out of date and, to all intents and purposes, valueless to the modern confectioner. The chief disadvantage was that batches had

## “ EUREKA ” VACUUM MACHINE

to be worked intermittently, and it was not until a continuous process was evolved that the evaporation *in vacuo* could be said to have been in any way a commercial success.

### “ EUREKA ” VACUUM MACHINE.

Though the boiling may be carried out over an open fire or even in a Steam-pan with internal steam-coils, the advantages of rapid evaporation with low temperature, secured by concentration *in vacuo*, are so great that no candy-maker in these days of severe competition can afford to ignore them.

The “Eureka” Patent Vacuum Double Receiver Machine for hard-boiled goods is certainly the best known apparatus of this kind on the market for the purpose of producing the driest, hard-boiled bon-bons of the highest quality and with the best keeping properties and for securing uniformity of excellence. The machine is made with capacities ranging from 200 lb. to 1,000 lb. of finished goods per hour, so that both the small confectioner and the large manufacturer should be interested in this process which is now so largely employed in England and on the continent of Europe as well as in America.

The melted sugar is drawn from the reservoir pan and is forced through a long, serpentine, copper coil, which passes through a steam-chamber maintained at about 50 lb. pressure at the top of the machine. The syrup is boiled in passing through this coil and is discharged into a receiving hopper connected with a jet-condenser in the column of the machine and with a vacuum pump. The steam is rapidly withdrawn as the hot syrup enters the receiving chamber which is steam-jacketted, and here the concentrated syrup commences to accumulate. As soon as a sufficient quantity has collected it can be discharged into a second hopper or chamber which is also connected with the vacuum pump and condenser, but which can be cut off both from the syrup supply and vacuum pump when sufficient concentrated sugar-syrup has been allowed to pass in. Air is then admitted to

## THE MANUFACTURE OF CONFECTIONERY

the second chamber, and the sugar-syrup is discharged in such a manner that the vacuum is never broken.

The actual method of procedure is as follows :—Filter the sugar-syrup from the Steam-pans into the reservoir of the Vacuum Plant. Close the vacuum pan hermetically with the closing gear, and start the vacuum pump. Turn off the cock connecting the second and lower chambers with the vacuum pump. When the air has been exhausted from the apparatus, open the suction-valve and, with the suction-pipe below the level of the syrup in the reservoir, draw in syrup till the bottom of the first chamber is covered to the depth of about 2 inches. The less glucose employed the lower is the vacuum and the higher the steam-pressure required, which latter, however, should never be allowed to create a temperature above  $110^{\circ}$  C. ( $230^{\circ}$  F.). The steam-cock is now opened gradually, and the water-cock of the pump opened at the same time. The operation of boiling should be watched through the peep-hole to see that the boiling syrup does not rise too high. The vacuum is allowed to continue till about  $55^{\circ}$  is shown, and the temperature is brought finally to  $110^{\circ}$  C. The progress of the boiling should be tested before the syrup is allowed to fall into the second chamber, by means of the tester. When the syrup is at the correct point of boiling, the cock connecting the lower chamber with the vacuum pump is opened and, as soon as the vacuum reading is the same in the upper and lower chambers, the handle operating the false bottom of the top chamber can be easily turned and the syrup transferred to the lower chamber, whence it can be removed in the receptacle placed beneath as soon as the bottom of the top chamber has been again closed and after air has been admitted into the lower chamber. The final receptacle is of such a nature that it fits closely, by means of a rubber washer, with the lower chamber so that it is held tight by the vacuum in the latter, or freed when air is admitted.

A description of the operation sounds somewhat compli-

## AUTOMATIC CONTINUOUS SUGAR-COOKER

cated, but the whole process is simple in the extreme and, once adjusted to the syrups in use, can be carried on continuously with the minimum of supervision.

Though pure sugar solutions may be boiled on the Vacuum Plant by a special process, it is not recommended to reduce the proportion of glucose in the boiling below 20 per cent. of the sugar used, as ebullition is always inclined to cause graining.

### THE "BAKER" AUTOMATIC CONTINUOUS SUGAR COOKER.

#### FOR HARD-BOILED GOODS.

As has already been pointed out, in order to maintain good, clear, white, dry sugar-boilings it is necessary to cook at low temperatures, or at high temperatures for a minimum length of time. Low-temperature cooking is better conducted in a Vacuum Plant, but it soon became clear that a continuous process would greatly benefit the sugar-boiler, and so recourse was made to the latter alternative—high temperatures for *minima* periods of time.

The Automatic Continuous Cooker made by Messrs. Joseph Baker Sons and Perkins Ltd. is the latest invention for the rapid and efficient cooking of a continuous stream of sugar-syrup. It is a development of that firm's "Eureka" method of cooking, but the process adopted for obtaining the desired results is entirely original. The main part of the machine consists of a steam-jacketted, vertical tube containing a hollow taper-spiral of gun-metal. The syrup is pumped through the machine by a gun-metal pump, the stroke of which is regulated by a slot-link control. By increasing the strokes, the flow of syrup is quickened (or inversely slowed down by decreasing the strokes) whilst the syrup is in actual contact with heat for correspondingly lesser or greater periods of time. In this way the temperature of the issuing sugar-syrup can be readily controlled.

The syrup enters the machine at the top of the spiral and,

## THE MANUFACTURE OF CONFECTIONERY

in a thin film, swirls downwards whilst subjected to the action of the heat from the outer steam-jacket (at about 120 lb. steam-pressure) and from the inner exhaust-tube.

The superfluous moisture is released as vapour as the syrup travels downwards, and, at the bottom of the spiral, is a chamber in which the flow of syrup is momentarily retarded to allow the vapour to escape through the hollow centre of the spiral to the atmosphere. The cooked syrup passes through a check-valve, over a thermometer, on to a revolving cooling-table, whence it can be removed to the Drop-rollers when of the correct consistency. As the syrup is in contact with the heat for a period varying only from 8-10 seconds, perfect colour is secured, whilst the intense heat for this short period allows of complete separation of moisture, resulting in absolutely dry boilings.

The output of the machine is approximately 400 lb. of cooked syrup per hour if hard-boiling is in progress. When used for cream-making, for which the machine is equally suitable, the output can easily be increased to 600-800 lb. per hour.

One advantage over the Vacuum Plant, is that the Automatic Continuous Cooker can be used for pure sugar-boilings just as easily as for mixtures of sugar and glucose, which last may contain up to 60 per cent. of glucose if required.

### FOR "TRANSFORMED" SUGAR.

For the continuous production of "amorphous" or "transformed" sugar, a variety of grained sugar eminently suitable for the manufacture of finest fondant chocolate, milk chocolate, couverture, etc., the Automatic Continuous Cooker has proved of exceptional value, and the writer can speak of the efficiency of workmanship, output and durability of the machine after ten years of continuous work.

### FOR COOKING TOFFEE.

The Automatic Continuous Cooker has more recently been adapted for the continuous boiling of toffees, with



SUGAR BOILERS'  
STOVE



HOT AND COLD  
POURING PLATE

## THE MANUFACTURE OF CONFECTIONERY

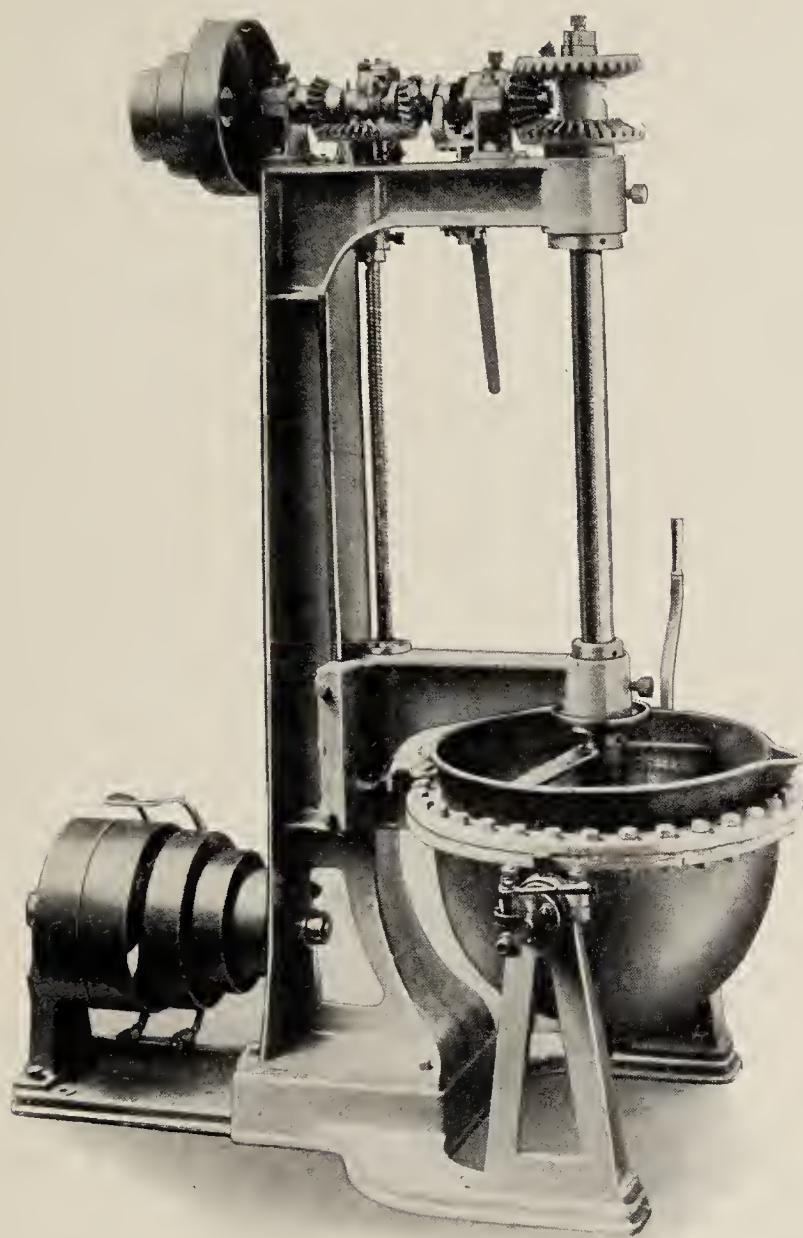
which it deals in a most economical and efficient manner. The enormous saving of labour and the regularity of the products are points that should commend themselves to all large toffee manufacturers.

### HIGH-SPEED MIXING PAN FOR TOFFEES.

This is an excellent machine for manufacturing toffees and similar goods, and embodies the uses of a Steam-jacketted Mixing Pan with High-speed Beaters or Mixers which maintain perfect lightness and a thorough incorporation of the ingredients. The necessity for keeping a toffee-mixing, which contains such apparently immiscible ingredients as fat and syrup, in a continuous state of motion until complete blending has taken place is obvious, and this machine accomplishes this purpose in a highly efficient manner.

The Steam-pan is a strong construction of the ordinary High-pressure Steam-pan, so well known to every confectioner, slung in such a manner that after the beaters have been raised it can be tilted for the purpose of discharging its contents. The beaters or mixers can be easily raised from the pan to the position shown in the illustration, so that they can be cleaned and scraped free from adhering material. Little hinged finger-scrappers touch the sides and continually clear the surface of the pan when the beaters are in position and revolving, and so prevent local burning of the toffee-mixing on the hot surface of the steam-pan. The beaters themselves are driven at high speed, and not only keep the mixing in a continual state of agitation but ensure thorough incorporation of the ingredients and give the lightness which is so desirable in the toffees of to-day.

One of the many secrets in securing brilliance, clearness and whiteness of boiled-sugar goods is the maintenance of thorough cleanliness of the machines and apparatus used. At the dinner-hour, it is well to fill up the "Eureka" Vacuum Plant and the Continuous Cooker with water, and to bring to the boiling-point. This wash-water need not be wasted, but



HIGH-SPEED MIXING  
PAN FOR TOFFEES

## THE MANUFACTURE OF CONFECTIONERY

can be used either for the same operation several times or for making up batches of coffee, chocolate and dark coloured creams or boilings. This precaution well repays the trouble taken.

### THE HOT AND COLD TABLES.

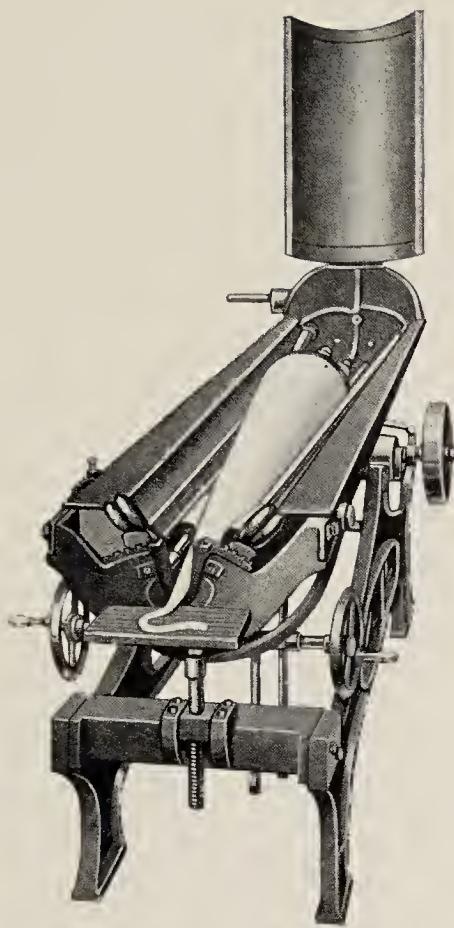
These should always be kept perfectly clean, well washed with soap and water, dried and, subsequently, lightly greased with odourless, white vaseline. Webbing of close mesh, smooth felt or leather is recommended for keeping the sugar warm on the tables, and a liberal dusting with talc-powder is desirable to prevent the sugar from sticking, and for dusting the Drop-rollers.

### THE "SILVASHEEN" BATCH-ROLLER.

One of the latest improvements at hand for working hard-boiled sugar is the Batch-roller. This device saves considerable labour and enables a perfect stick of hard-boiled candy to be spun without smearing or spreading of the stripes of coloured sugar of which the batch is composed. It will keep hard batches and soft batches, or sugar with soft centres, quite round all the time, and has the great advantage of continuous work without careful watching.

For making little sticks and all pure sugar goods, this machine fills a long-felt want and keeps your batch at an even temperature, whilst soft centres will not break through the cover on this machine as they are inclined to do on the old spinning board. The gloss and finish of the goods from the Batch-roller are excellent as you can spin the sugar harder, a fact which, as is well-known, will always result in goods with a high gloss.

The machine consists of a steam-heated cylinder which is balanced so that it can be tilted backwards and forwards if desired. In the lower half of the cylinder six tapering rolls revolve, covered with galvanised wire of varying mesh. The touch of a hand lever causes these rolls to spread out



THE "SILVASHEEN"  
BATCH-ROLLER

## THE MANUFACTURE OF CONFECTIONERY

like a fan at the feed-end. In this position the machine receives the batch. Another touch on the lever and the rolls close round the batch, pressing it closer and closer by means of the automatic spring action as the work proceeds.

The feed-end of the machine is closed by a disc which, by the spring action, automatically pushes the batch forward.

A simple gear device causes the rolls to rotate, first one way and then the other alternately, so that the batch is treated evenly.

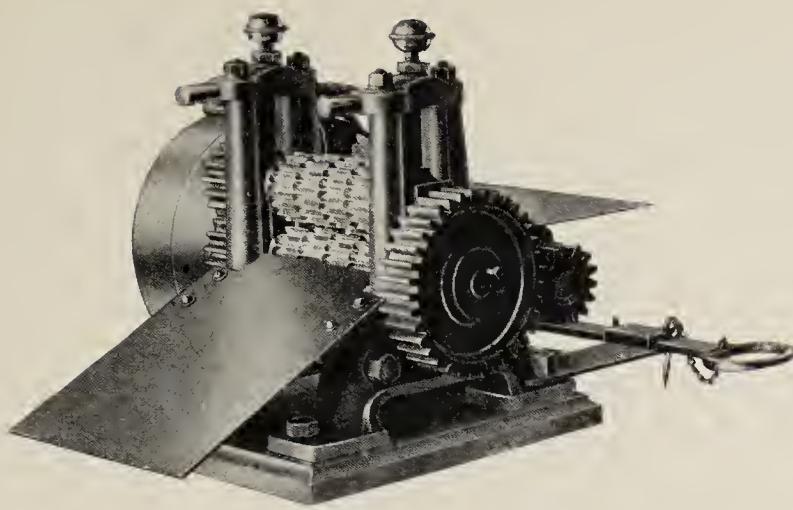
When the batch, diminishing in diameter as it travels, reaches the delivery end of the machine it is automatically reduced by gauging rolls to the size desired by the operator.

It will be seen from the above description that the machine is purely automatic, and it therefore follows that the batch, untouched by hand and preserved at a uniform temperature, comes out with a brilliance of gloss and perfection of finish unattainable by any other process.

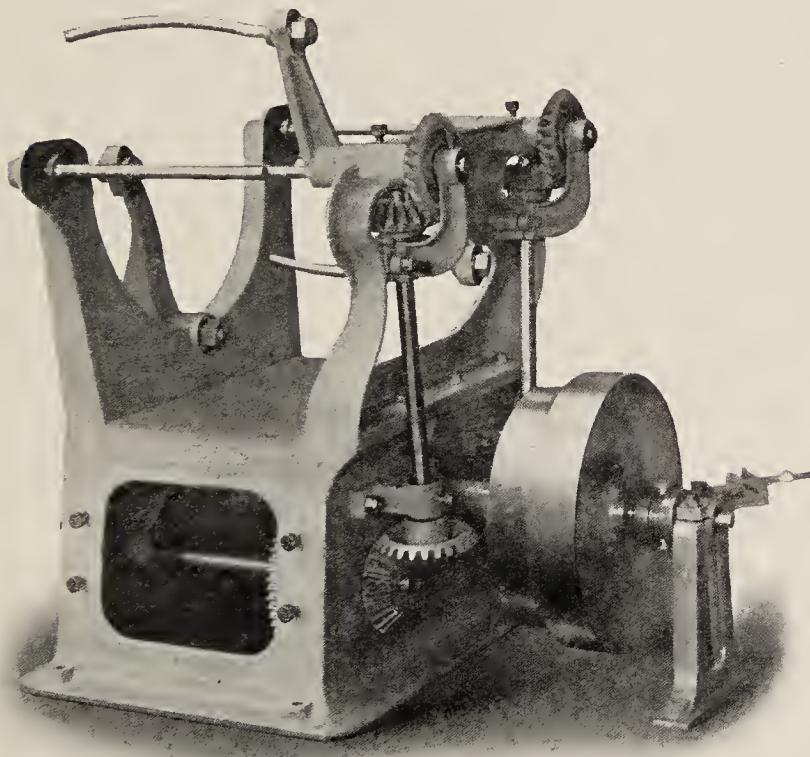
### THE DROP-ROLLERS.

Drop-rollers are usually designed  $3\frac{3}{4}$  inches, 7 inches and  $8\frac{1}{4}$  inches in length, with the design stamped or embossed on both rollers, the accurate registration of the designs being important if well-shaped goods are to result. One or two firms have specialised in the production of these rollers, and though, of course, the well-made, accurately registering rollers cost more money, it is interesting to note that the best confectioners are more than willing to pay the extra cost in order to obtain the excellent finish. The simplest form of machine is obviously one set of rollers, but these can be duplicated to any extent, and, with interchangeable rollers, a few sets of machines are capable of turning out very large quantities of hard-boiled sweets.

The New Automatic Plate Drop-roller Machine, illustrated, has been designed with a view to securing the largest output possible. Six pairs of drop-rollers are fitted upon a strong frame which revolves so as to bring any pair opposite to the



HIGHLY FINISHED DROP  
ROLLER MACHINE FOR POWER



CANDY-PULLING  
MACHINE

## THE MANUFACTURE OF CONFECTIONERY

table and into mesh with the driving gear. By this arrangement when one pair of rollers becomes overheated it can instantly be replaced by partially revolving the frame to bring another pair up opposite the table. The drive to the rollers is controlled by a clutch on the right-hand side of the machine. The sheet of drops after passing through the rollers is delivered on to steel bands which carry it forward at the same speed as it is delivered from the rolls, thus avoiding deforming the drops by handling. The sheet of drops as it passes down the table is fanned by a strong current of cool air, which can be regulated and directed by a system of dampers. The cooled sheets are carefully broken up by a special attachment, and the sweets are automatically sifted and delivered direct into boxes placed ready to receive them. The approximate output of these machines is 200 to 300 lb. per hour, though larger machines are made fitted with 7 inch or 8 inch rollers as required.

### CANDY-PULLING MACHINE.

In order to obtain the beautiful "satin" effects which are so deservedly popular to-day, the Candy-pulling Machine has become an essential feature of the hard-boiling room. The softness and brilliance of the effect are dependent as much upon even and thorough pulling as upon the sugar batch, so that, whereas the hand candy-hook is capable of giving good results when operated by a very skilled workman, the limited output and the possible irregularity of the pulled batch have made the large power-driven Candy-pulling Machines both desirable and necessary to the confectioner in the production of the highest class "satin" goods.

Moreover, certain goods such as butter-creams, molasses-taffy and other light confections, which first hailed from America, demand pulling in order to secure the lightness and softness so characteristic of this class of confection.

Candy-pulling machines are made by every manufacturer of confectionery machinery, and there is nothing in any



THE "AUTOSATINE" WITH COOLER CONVEYOR

## THE MANUFACTURE OF CONFECTIONERY

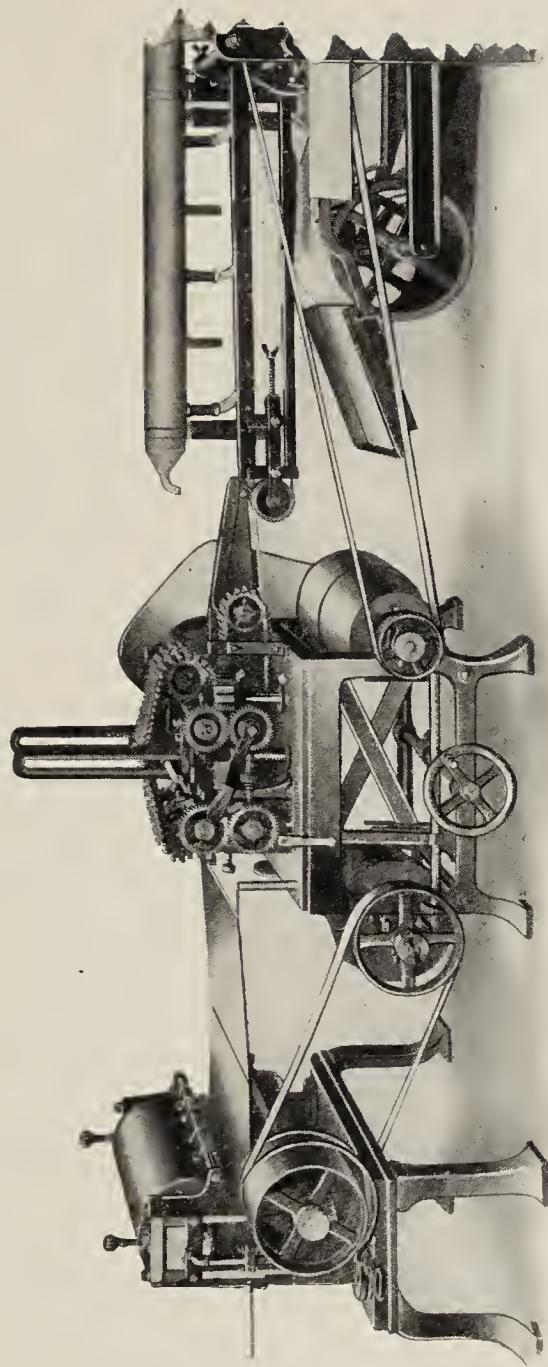
particular maker's design to call for special mention here. They are made in various sizes (7 to 120 lb. or more of boiled sugar at a time), the one illustrated being eminently suitable for producing light bulky goods of thoroughly even texture. The steady regularity of the pull and the speed with which large quantities of sugar can be dealt with are points in favour of the machine illustrated.

### THE AUTOSATINE MACHINE.

For satinettes, cushions and other filled goods it is essential that the sealing process be perfect and complete, not only in order to render the pieces good to look at, but for the more utilitarian purpose of keeping the soft contents from leaking out. The Autosatine Machine was designed for the purpose of effecting a perfect seal on goods of this kind, and one machine will cut 2,340 soft-centred satinettes per minute, thus providing a remarkable labour-saving device for the confectioner. One machine cuts continuously, without special adjustment, satinettes  $\frac{3}{8}$  inch,  $\frac{3}{4}$  inch and  $1\frac{1}{2}$  inch long, and cushions  $\frac{3}{4}$  inch long, whilst the width of each piece may vary from  $\frac{1}{8}$  inch to  $1\frac{3}{4}$  inches, as required.

### THE GAEBEL CONTINUOUS AUTOMATIC PLASTIC BONBON MACHINE.

The "Plastic Bon-bons," as they are usually known to the confectioner, or the more usual "Fruit Candies," "Caramel Bonbons," "Kisses," etc., of the sweet-eating public, have won deserved popularity. Perhaps most of us think of the name of Heller when we see and eat these delicious transparent bonbons, with a beautifully coloured and luscious centre of fruit—indeed, it is the writer's opinion that Heller's confections of this class have never been beaten yet. There are two secrets in the preparation of these bonbons. One lies in the use of the highest quality of ingredients, of the whitest sugar, boiled to perfect transparency in a "Eureka" or "Continuous Cooker," such as has already been described, and of the finest fruit pulps, boiled neither too stiff nor too



THE GAEBEL CONTINUOUS AUTOMATIC PLASTIC BONBON MACHINE

## THE MANUFACTURE OF CONFECTIONERY

soft, of correct sweetness and acidity, and flavoured with the finest of fruit essences. The preparation of fruit jellies has been described briefly, and under the recipes will be found a number of formulæ which will meet all the requirements of the confectioner wishing to manufacture this class of goods.

The second secret lies in the manipulation or preparation of the bonbon. The old method of manufacture was clumsy in the extreme ; after the soft centres had been placed in the boiled sugar, sufficiently cooled to allow handling, the cone or cylinder was rolled or pulled out by hand to the required thickness, which ranged from that of a pencil to a stick of  $\frac{1}{2}$  in. or more, and placed beneath the two pressing jaws of the Candy Press. The jaws, which contained the dies, were brought together, and the stamped stick of filled candy had to be removed and another length inserted, to go through the same process. This method has several disadvantages : (1) that it is intermittent in operation ; (2) that the stick, unless absolutely correctly cut to the size of the press (an impossibility in practice) always protruded at both ends over the length of the die, thereby causing this amount of waste, which, in the course of a year, amounted to a considerable proportion of the finished goods ; and (3) that as an equal pressure was exerted over the whole stick of filled candy undergoing the stamping process when the dies had met over the stick, any unevenness due to the pulling or rolling was shown on the design on the stamped goods, necessitating sorting over the clear-cut designs from the imperfect bonbons ; (4) that the goods were always liable to stick in the press, causing a stoppage of the machine ; (5) that the sticks of candy had to be cut before being placed in the press ; (6) that the pressure exerted was too sudden, causing the bonbons to burst or to be inefficiently sealed.

In the Gaebel machine these disadvantages have been overcome by employing a continuous process in which the stick of candy is shaped to even dimensions, and passed between continuously running dies, operated on chains by

## THE GAEBEL PLASTIC BONBON MACHINE

means of which a gradually increasing pressure is brought to bear upon the candy. In this way great precision is secured, with larger output and a minimum amount of waste. A cooling chamber and cooling apparatus may be attached, so that, firstly, the bonbons are cooled, ready for packing or wrapping, and, secondly, when working with more than one series of dies the different designs may be separated automatically.

The following special claims are made for the machine :

1. Continuous movement with absence of jerkiness.
2. An undivided strip of candy is used.
3. No waste.

4. Bonbons do not stick to the dies, and as a continually increasing pressure is exerted upon each separate bonbon it follows that each individual confection leaves the machine with a consistently perfect impression and perfectly sealed ends.

5. There is no need for hand sorting.

6. There is no scrap.

7. There is no more rational method of manufacture.

8. The labour required is small : one sugar puller, one assistant, and two persons to carry away the finished goods from the delivery table.

9. A high output : 300 lb. of plastic bonbons, each bonbon perfect in finish, can be turned out per hour. It is possible to run some 24 yards of candy through the dies per minute.

## THE MODEL " K " KISS CUTTING AND WRAPPING MACHINE.

The Model " K " Kiss Cutting and Wrapping Machine (illustrated) performs three operations, which, before its introduction, were carried out on three separate machines.

The " K " machine takes a batch of toffee which has been spun to approximately the proper size, feeds it between sizing rolls, shapes it to the proper size, cuts it and wraps it in either plain or printed paper, which is automatically cut from a roll. The ends are twisted firmly and the toffee is discharged into a box.

## THE MANUFACTURE OF CONFECTIONERY

The machine effects great savings of time and labour. One machine turns out about 150 pieces of wrapped toffee per minute.

There are many other machines that are of occasional use or special for specific confections, but, needless to say, they are too numerous for detailed description here. Among such machines may be mentioned :—

The Ball-rolling and Satinette-making Machine.

The Rock-cutting Machine.

The Hand Patent Mint, Shell, Bull's Eye and Pennet Cutter.

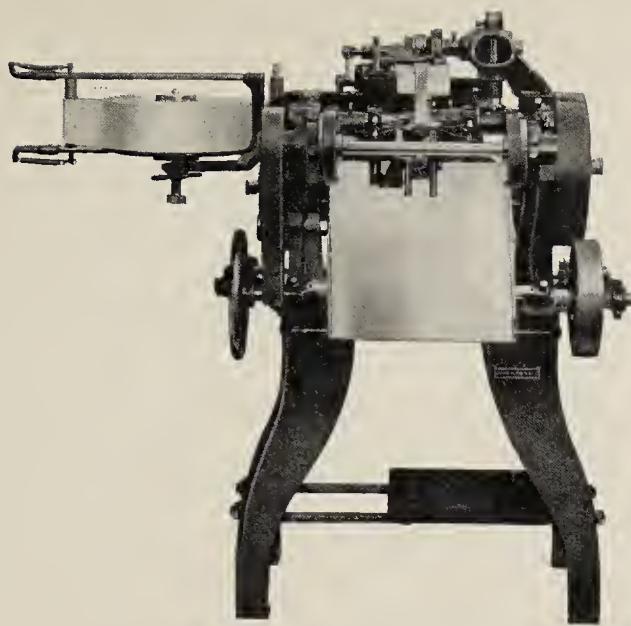
The Plait or Flat, Ornamented Stick Machine (combined).

All particulars of these machines can be obtained from Messrs. Joseph Baker Sons and Perkins Ltd., Kingsway House, Kingsway, London, W.C.2.

### “ AMORPHOUS ” OR “ TRANSFORMED ” SUGAR.

The preparation of a special sugar for the manufacture of chocolate has already been briefly mentioned, and it is not intended to go here into elaborate details of the machines employed. It is desirable, however, to realise that the increasing needs of the manufacturer of chocolates and candies are being carefully considered and that there is at any rate one firm of expert confectionery engineers that is spending time and money on research. New principles, both for improving modern confectionery and for simplifying the processes employed by the confectioner, are continually being studied at the works of Messrs. Joseph Baker Sons and Perkins Ltd., who hold the field to-day both for superiority of workmanship of machines for all confectionery purposes and for pioneer work in this ever-growing industry.

It has long been appreciated that the machinery necessary at present for the manufacture of the best quality chocolate in bulk is large and, to all appearances, cumbersome. To the simplification of this machinery or series of machines the eyes of every large chocolate-manufacturer and confectionery machine-maker have been turned, at present without great success.



THE "KISS" CUTTING AND WRAPPING MACHINE

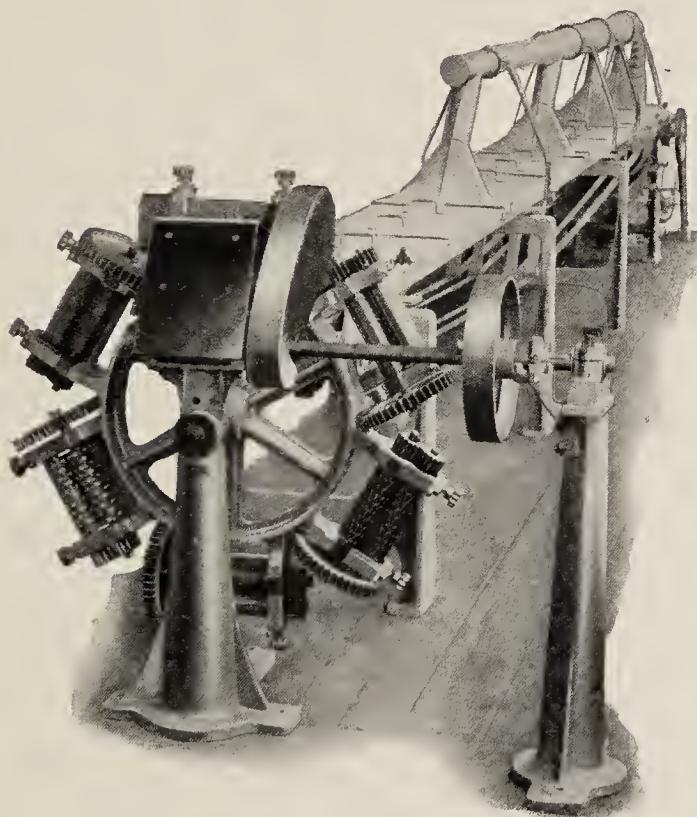


PLATE DROP ROLLER

## THE MANUFACTURE OF CONFECTIONERY

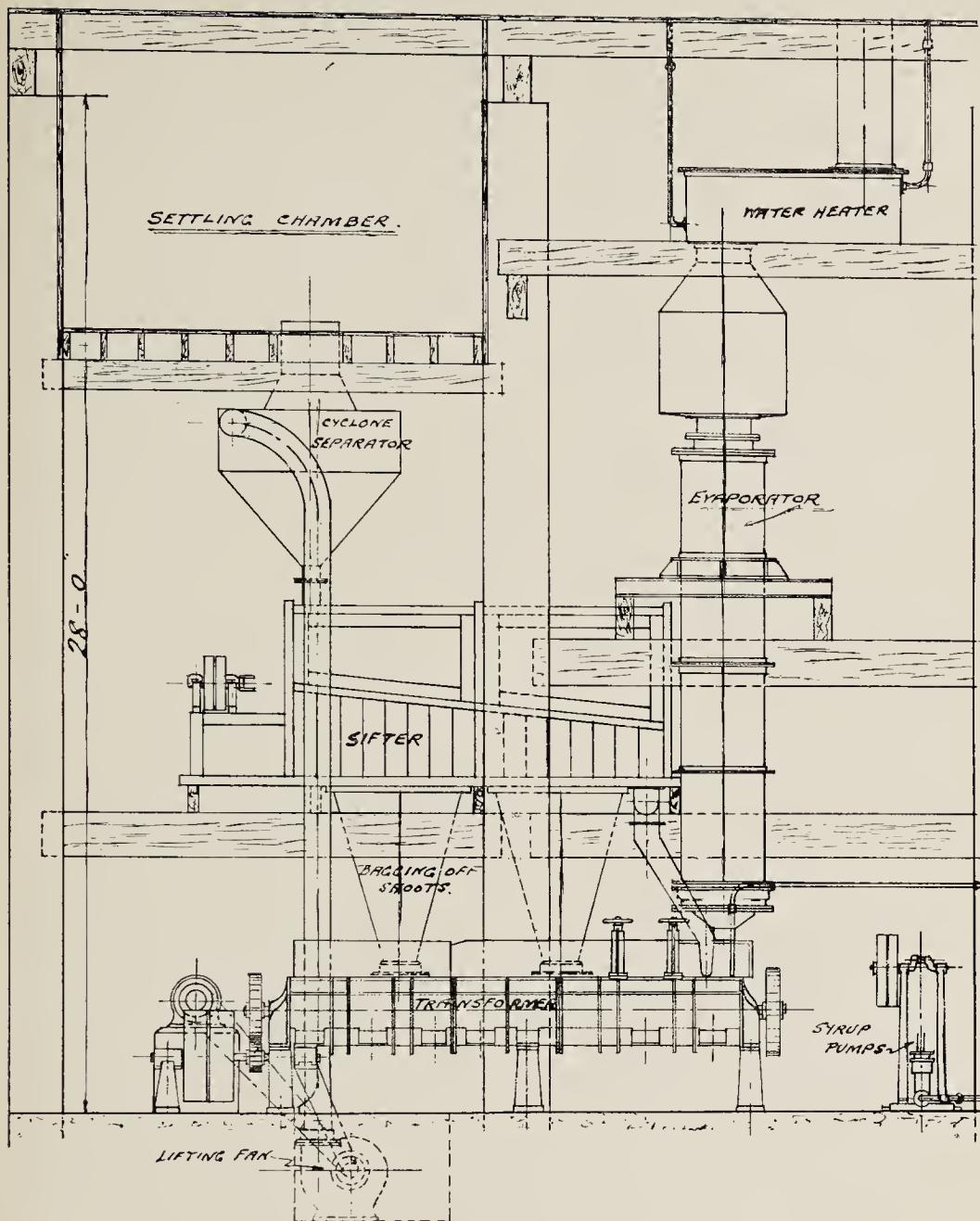
By collaboration with the present writer and with the co-operation of Messrs. Peek Frean and Co., Ltd., and Messrs. Rowntree, Ltd., an attempt was made to secure simplification by a preliminary treatment of the ingredient composing the bulk of chocolate, namely sugar, since it was realised that most of the chocolate-machines were designed for refinement or removal of the gritty sensation of the sugar upon the teeth and palate.

Finally a sugar and a process for its manufacture were evolved, the sugar possessing the necessary degree of softness which not only saved a number of treatments on the Steel and Granite Chocolate-refiner, but which greatly assisted the manufacturer in his process and in his profits.

The principles underlying the preparation of "transformed" sugar are based on securing :—

1. A soft grain requiring the minimum amount of crushing.
2. A grain of such a size that, once well incorporated in the chocolate, it cannot be felt as grit on the palate or teeth.
3. A product of such a nature that a considerable saving of added cacao butter can be made (10 per cent. of this added butter is often saved in practice).
4. A continuous process of manufacture of the prepared sugar so that raw sugar can be treated after refinement, or semi-refinement, to white or tasteless sugars, thereby securing additional profit in the difference between the costs of raw and refined sugars and the cost of the process of transformation.

The means by which these results are obtained are too involved to explain here, though the process of preparation of the finished sugar is simplicity itself. The finished sugar, ready for sacking up or for use directly in chocolate, can be manufactured at the rate of 1 to  $1\frac{1}{2}$  tons per hour, according to the quality of sugar originally employed. The whole



LINE DRAWING  
OF AMORPHOUS PLANT

ELEVATION

## THE MANUFACTURE OF CONFECTIONERY

operation has been covered by patents taken out all over the world, and the excellence of the results testifies to the success of the original enterprise, which must have benefited the chocolate-manufacturer to the extent of many thousands sterling since its inception.

The Continuous Sugar Cooker plays no small part in the preparation of "transformed" sugar, and, as a knowledge of sugar-boiling is essential for the successful production of the best form of "transformed" sugar, the process is mentioned in this place.

### MACHINES EMPLOYED IN THE MANUFACTURE OF FONDANT.

If sucrose, the ordinary sugar of commerce, is boiled up with water it is possible, with certain precautions and when a sufficiency of water has been evaporated, to obtain a clear vitreous mass. This is sought in the manufacture of hard-boiled goods, and, in order to prevent the glossy mass from going cloudy (crystalline) on keeping, confectioners' glucose, or acid that will slightly invert the crystal-sugar, is added. Such additions provide the "cut" or "semi-cut" with which the confectioner is familiar.

If sucrose is just boiled up with water to a thick syrup until it has a boiling-point of, say,  $125^{\circ}$  C. ( $257^{\circ}$  F.), the pan removed from the fire and the contents stirred with a fraction of powdered crystal-sugar, or a portion rubbed on the side of the cooling pan, spontaneous crystallisation will take place, and a sudden rise of temperature will be noted. The resulting sugar is dry and can be easily powdered, and, according to the degree of stirring, will be composed of small or large crystals. Very slow cooling and absence of movement make large crystals; rapid cooling and stirring, small crystals. The contained water is entirely driven off by the rapid evolution of heat as the sugar crystallises, and the resulting sugar, as has been said, is dry.

In the preparation of fondant, a soft, moist, creamy mass

## FONDANT MANUFACTURE

is required from sugar and water, with just the amount of "cutting" material necessary to prevent continuation of crystallisation on standing. The best products are those that are creamy, soft and smooth, and, clearly, no further change must take place in the fondant after cooling, such as crystallisation, partial or complete, that could make the fondant gritty or hard.

Almost any fondant will eventually go stone-hard on exposure to the air unless it is well protected from the drying influence. A complete coating of crystal-sugar is sometimes adopted, or the fondants are covered with chocolate, by these means preserving the creamy mass from desiccation.

The "cutting" materials used are usually confectioners' glucose, tartaric acid or cream of tartar, the actions of which have already been briefly outlined.

The cooking of the materials, sugar, glucose (acid, or cream of tartar) and water for the preparation of fondant can be conducted in an open pan over a fire or in a Steam-pan, but most economically on the Continuous Cooker already described.

In order to obtain the creamy smoothness, rapid cooling and stirring (beating) must be adopted according to the principles already laid down, otherwise the sugar-crystals, which may form around a nucleus provided by any solid particle, will grow slowly larger and larger in the soft medium, and become grains of such a size that would cause roughness on the palate.

In open pans and Steam-pans, fondant-cooking is attended by the danger that on the sides of the pans small crystals are inclined to separate, and these form nuclei for larger growths subsequently, and themselves are gritty. Thus, when boiling in pans, the sides of the vessels should be washed down with water occasionally so that the crystals re-dissolve in the boiling liquid.

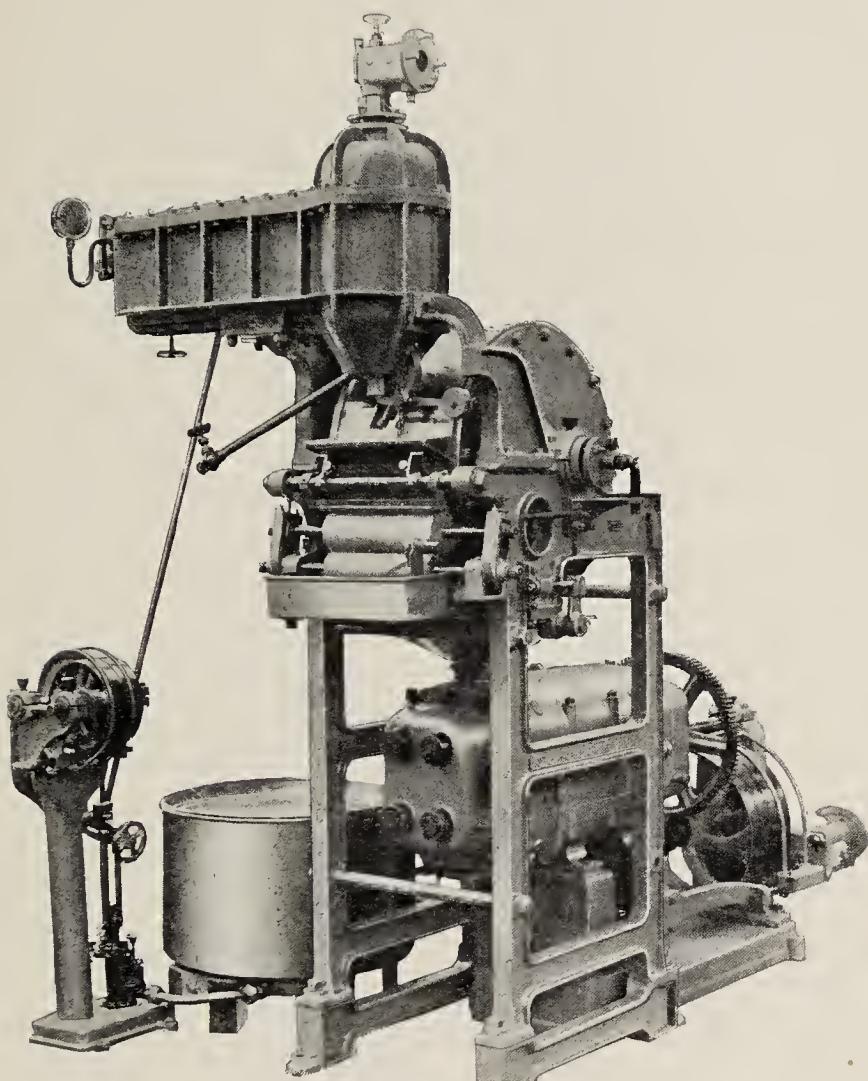
The principle underlying the preparation of fondant-cream being now appreciated, the arrangement of the confectionery room should be considered.

## THE MANUFACTURE OF CONFECTIONERY

Steam-pans are arranged along one side of the room, and the Vacuum Sugar Cooker and Continuous Sugar Cooker are placed in such positions that the products can be taken to the hard-boiling department on the one hand, with its Cooling and Hot Tables, Drop-rollers, etc., and to the Fondant-beaters on the other, whilst in close proximity should be the starch-room, the drying-room and crystallising-chamber. The confectionery or boiling-room is often insufficiently ventilated, and it is essential, both for good working and for the health of the workers, that the steam from the boilings should be carried out of the room. This is done by various means such as hoods over the steam-pans, by ventilating-fans, etc., but the Continuous Cooker has the great advantage also of carrying away its own steam.

### MAKING FONDANT BY HAND.

The sugar-fondant mixing, after it leaves the Steam-pans or cookers, is carried to the cooling-slab, properly cleaned and encircled with bars of clean iron to prevent the liquid sugar from running off the table. Where Fondant-beaters are used, as is universally the case when any quantity of fondant is made, the sugar-syrup is conveyed into them direct. The syrup, which (of an original mixing of, say, 16 lb. crystal sugar, 2 lb. glucose, 2 quarts of water), when correctly boiled, to about  $240^{\circ}$  F. ( $115.5^{\circ}$  C.), or "double thread," or "blown," is cleared of scum. The slab is then sprinkled with cold water, and the syrup poured into the frame made by the borders of the iron bars. The top of the syrup must be sprinkled with a little cold water, and the whole is left to cool for about an hour to  $90^{\circ}$  F. ( $32.2^{\circ}$  C.), before which it must not be touched, otherwise, if beaten before properly cool, the crystals will grow to an appreciable size in the cooling and concentrating medium. When the fondant-syrup is sufficiently cold (for the syrup must not be stone-cold) the iron-bar frame is removed, and the sugar worked backwards and forwards with the spatula until a thick,



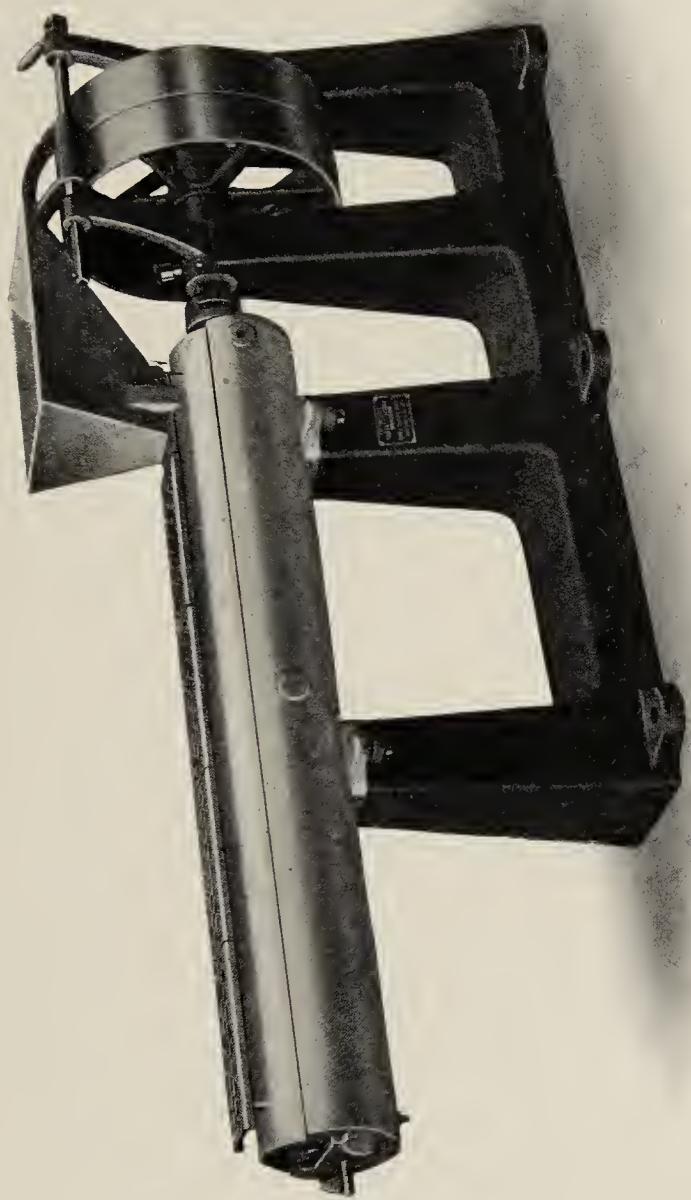
THE "HANDY" CREAM AND  
FONDANT MAKING PLANT

## THE MANUFACTURE OF CONFECTIONERY

white, creamy mass is obtained which will set into a very stiff paste. This is placed in a large tin or crock, and forms the "stock fondant" for further use. It is only right to add here, especially as Mechanical Cream-beaters are next under consideration, that the finest and softest creams can only be made by hand.

### THE "HANDY" CREAM AND FONDANT-MAKING PLANT.

When Cream-beaters are employed, the problem of obtaining smooth cream-fondant in an automatic process has been carefully thought out. In the machine, illustrated, called the "Handy" Cream and Fondant-making Plant, fondant-making is reduced to a simple continuous process. Firstly, the syrup is placed in the receiving pan shown on the left of the machine, whence it is pumped by a variable-stroke pump through the "Handy" Cream-boiling Machine. This machine has spiral passages formed in gun-metal and copper inside a steam-chest, through which the syrup is pumped rapidly and subjected to the heat from the outside of the passage. Intimate mixing is assured by the swirling motion imparted to the syrup in transit, and, by these means, greater variations in the proportion of sugar to glucose can be employed than in an ordinary Open Vacuum Pan. From the boiling-machine the syrup is discharged directly into the hopper of the gun-metal revolving water-cooled drum which practically instantaneously cools the syrup down and so prevents any tendency to grain. The film of cooled syrup is removed from the drum by an adjustable, brass scraper attached to the lowest point of the drum, and falls direct into the hopper of the Continuous Cream-beating Machine, which can be fixed underneath. The Four-cylinder Beating Machine, described next, is recommended for working with the "Handy" Fondant-making Plant. The great advantage of continuity in the process of cream-making is that, once the machine is regulated, the quality and colour of the cream turned out do not depend upon the judgment of the operator.



THE "JACOLUCCI"  
CREAM-BEATER

## THE MANUFACTURE OF CONFECTIONERY

but are invariable. A very considerable saving of labour and floor-space is gained.

### PATENT FOUR-CYLINDER CREAM-BEATING MACHINE.

This Beating Machine may be supplied alone and without the fondant-making plant just detailed. It is, of course, necessary to concentrate the syrup, and eminently desirable to cool it before placing it in the beater. The syrup, if once disturbed after concentration, tends to grain very rapidly, and it is, therefore, of much importance that the beating process should be continuous and rapid. These conditions are fulfilled by the machine illustrated. The cream or fondant-syrup is discharged into the hopper of the machine from the cooler, which usually stands over it, and is carried through the two top cylinders and back again through the two bottom cylinders by paddle-beaters, arranged helically so as to keep the cream in constant motion in a forward direction. The finished fondant is discharged through the mouth-piece with a slide into storage tanks or pans and becomes the "stock fondant" already mentioned.

### THE JACOLUCCI CREAM-BEATER.

Mention must be made of the Jacolucci Cream-beater which is one of the simplest machines for the purpose on the market. This Cream-beater has been found to be a most efficient and versatile machine, being well adapted for production of cream either in small or large quantities. It beats with equal facility bon-bon or dipping cream, producing an exceptionally smooth high-grade cream, as well as handling efficiently cream containing a large percentage of glucose. The Beater is provided with a jacketted cylinder for the circulation of cold water, thus ensuring the proper temperature during the heating process. The "Jacolucci" has the additional advantages of simplicity of design, that it can be easily taken apart and cleaned, and that it occupies an amazingly small floor-space.

Another method of mechanical cream-beating is that of

## PRESERVED FRUITS, JELLIES, ETC.

the Revolving Fondant Cream-stirrer, in which the action of the hand-spatula is more closely simulated. The syrup is run into the large, flat pan, where it is allowed to cool to the required temperature, and the pan is then made to revolve. A series of fixed, curved blades, fitting closely into the bottom and sides of the revolving pan, turn the cream continuously, and a very thorough beating, though slower, is thereby brought about.

For further treatment of fondant, working up "stock fondant," flavouring, depositing, drying and crystallising, the special sections devoted to these operations should be consulted. In this place the principles of sugar-boiling, and machines for its correct manipulation, only are considered, the further operations in the preparation of the confections being separately treated under their special headings.

## MACHINES EMPLOYED IN THE MANUFACTURE OF PRESERVED FRUITS, JELLIES, ETC.

The principles underlying fruit-boiling are not very complex, yet the results obtained depend entirely upon the skill of the boiler and his knowledge of the chemistry of fruits and sugar. Thus, jams are not preserved fruits but separate confections often differing widely in flavour from the fresh fruits from which they are prepared or, again, preserved fruits are not jams but an attempt to maintain the colour, shape and flavour of the natural fruits as far as possible by means of treatment with sugar.

If we consider jam first of all, the proportion of fruit to sugar is usually 1 : 1, boiled down to such a consistency that a semi-jelly or semi-viscous confection results. According to the degree of boiling so will the viscosity vary, all other things being equal, whilst it should be remembered that over-boiling will result in a stiff, tacky product, and under-boiling will give jams of poor keeping qualities. Again, red fruits such as raspberries, red-currants, red plums, etc.,

## THE MANUFACTURE OF CONFECTIONERY

should be boiled for as short a time as possible if the rich red colour is to be preserved in the finished jam, over-boiling tending to brownness.

The addition of glucose or acid to prevent crystallisation of the jam is seldom required, as the naturally occurring fruit-acids provide all the "cutting" that is necessary.

The juice of fruits, fruit-pulp, or fresh fruit, if boiled with an equal weight of crystal-sugar, will be ready in from 10 to 30 minutes, according to the consistency of the jam required and the method by which the heat is applied. Jellies for dropping out into starch are discussed in a later chapter where recipes are given, as only slight modifications from jam-manufacture are necessary, and these can be better considered with the recipes.

### FRUIT-PULPING MACHINES.

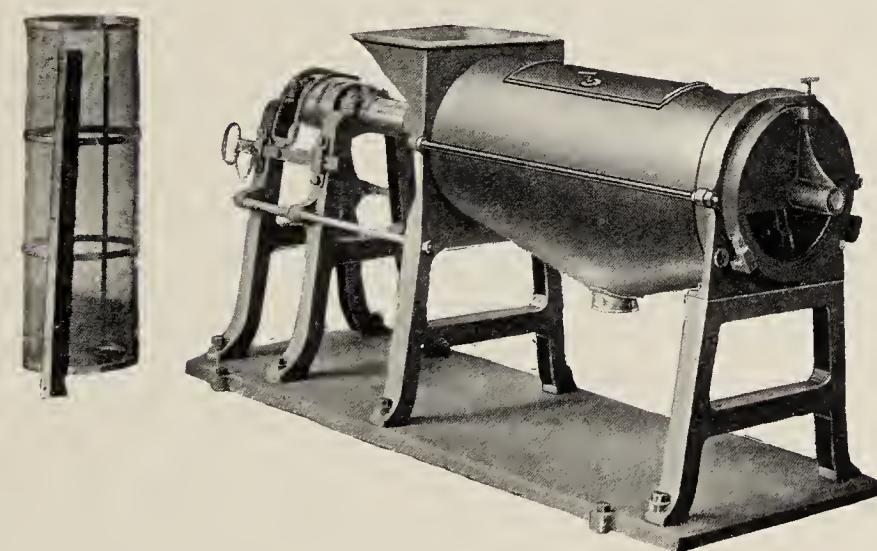
In order to remove pips, stalks, stones, etc., from plums, oranges, raspberries, strawberries, currants, dates, etc., which would otherwise detract considerably from the quality of the jam, the fruit-pulp or fresh fruit (unless the whole fruit is desired to appear in the confection, in which case hand-picking must be adopted) is passed through a Pulping Machine, an illustration of one type of which is shown. These machines, which are capable of dealing with several tons of fruit per hour, are simple to work and strongly built.

### TIP STEAM JAM PAN.

The most suitable form of pan for jam-boiling is the Steam-jacketted Copper-pan, with tipping gear for easy removal of the jam after boiling. These pans can be made to any size for boiling 12 to 40 gallons or more, and of either deep or shallow design. The latter are often preferred by manufacturers, as they give a large boiling-surface. The Steam-pan can be fitted with an automatic stirring arrangement if desired, thus avoiding the use of the hand-spaddle or spatula.



STEAM-JACKETTED TILTING PAN



HORIZONTAL  
FRUIT-PULPING MACHINE

## THE MANUFACTURE OF CONFECTIONERY

Fruit-jellies, with or without the addition of gelatine, isinglass, Japanese jelly (seaweed), etc., are similarly prepared to jam, the degree of boiling depending upon the ultimate consistency of the goods required. The hot jellies may then be passed to the Depositing Machine and dropped out into starch-moulds as subsequently described.

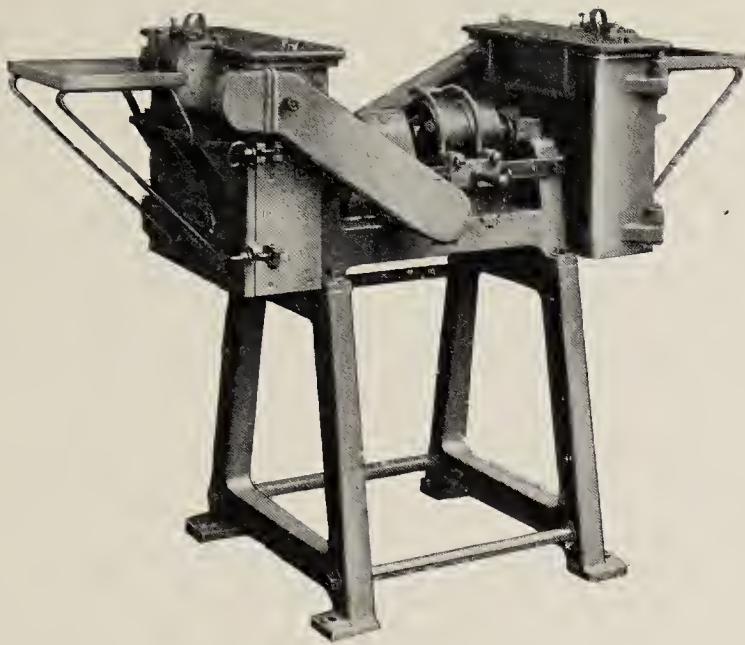
Other machines which the jam manufacturer will almost certainly require are :—

1. The Orange-chipping and Marmalade Machine ; or
2. Power " Compact " Marmalade Machine ; or
3. The Home-made Marmalade Machine.
4. Peel-cutting Machine.
5. Cherry-stoning Machine.
6. Gooseberry-snuffing Machine, for topping and tailing gooseberries.
7. Apple-parer, Corer and Slicer.
8. Steaming Barrel for Orange skins, etc.
9. Hydraulic Presses for fruits.
10. Filters for fruit-juices, jelly-straining, etc.

All these machines and many other labour-saving devices for the jam-manufacturer can be obtained from Messrs. Joseph Baker Sons and Perkins Ltd. on application to their offices or works.

### PRESERVING FRUIT.

Fruit is preserved by a system of bleaching, sugaring and preserving, involving the use only of Steam-pans, Vacuum Sugar Cooker and Fruit-preserved (especially suitable for candied peel and candied fruit), large, shallow earthenware or enamel pans, and a Steam-chest or Processing Retort for preparing and cooking canned fruits. The recipes and details of the operations are described in a later place. The aim of the fruit-preserved is to keep the shape, colour and aroma of the fresh fruit as little impaired as possible, whilst, in order to prevent fermentation or decomposition during the process of preserving, the application of alum or sulphur in the first stages may be necessary.



DOUBLE-HEADED  
ORANGE CHIPPER



STEAMING BARREL  
FOR ORANGE SKINS, ETC.

# THE MANUFACTURE OF CONFECTIONERY

## Chapter II.

*Machinery and Apparatus employed in Confectionery-Moulding, Depositing and Drying—Apparatus required for Crystallising and Sugaring.*

### CONFECTIONERY-MOULDING, DEPOSITING AND DRYING.

**H**AVING briefly discussed the principles of sugar-boiling, in which the preparation of fondant-cream, fruit-jellies, etc., has been outlined, it remains to describe how these confections may be moulded or cut into fancy shapes for the needs of the manufacturer, either for subsequent sugaring or crystallising, or dipping in *glacé* sugar, soft fondant-coating, or chocolate.

Again it should be remarked that the recipes, described in a later chapter, should be consulted if the nature of the goods suitable for depositing in starch is not understood.

All goods that should be dropped into starch-moulds should be of such a nature that, whilst it is required to maintain a soft consistency within the confection, a sufficiently hard crust on the outside is wanted to enable the operator—in the crystallising or dipping-departments—to handle the goods without malformation of the bon-bon. This applies particularly to fondants, jellies and liqueur centres.

#### STARCH.

The starch usually employed is the finest, dry corn or maize starch, which takes the imprint of the plaster-moulds in great detail and is the quickest to absorb moisture from the semi-liquid fondant or fruit that is dropped into it. The printing or impressing of the starch can be accomplished by hand or by machine, and the starch can be used over and over again.

## MOULDING APPARATUS FOR CONFECTIONERY

### RUBBER MATS.

On the other hand, some manufacturers make use of rubber mats in which the designs have been impressed, into which are dropped the liquid fondant, etc. Such devices have special advantages where large, rounded figures are required, which would be difficult to mould in starch. It should be understood, however, that rubber moulds are best suited to goods that set on cooling, rather than to those that require a drying, whether locally applied as in the case of liqueur centres which need the thinnest possible coat of dry sugar on the exterior, or more completely applied for such goods as have to be placed in starch-trays in the drying room subsequently. This is readily appreciated when it is realised that the rubber moulds are not porous but serve as frames merely to hold the shape of the semi-liquid confection whilst it sets on cooling. The construction of the best rubber moulds allows a free circulation of air or water, if desired, underneath every mat, thereby aiding goods to cool rapidly and preventing the moulds from becoming overheated, a danger which tends to deteriorate the rubber. Such mats can be filled and dumped two or three times an hour, and may be worked all day at the same rate, but care must be taken after each batch to dip the moulds in cold water and to drain them for several minutes before again filling. The mats are usually made to hold fifty to sixty impressions and can be constructed to use with Depositing Machines.

### STARCH-MOULD BOARDS.

The moulds are made of plaster of Paris, as a general rule, and are fixed with gum and wire on to wooden boards. The number of rows of impressions to be made in the starch varies according to the goods to be deposited and whether the deposition is to take place from hand-dropping cans or by means of a Mechanical Depositing Machine. The more wet goods, or those requiring greater drying, are better

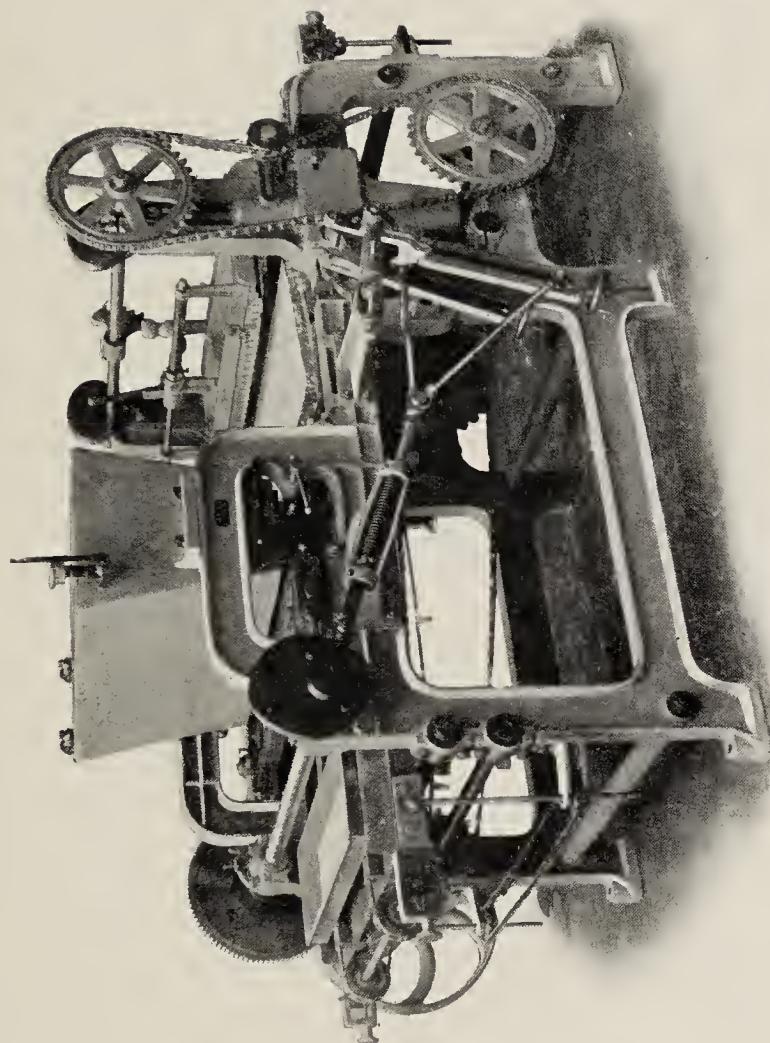
## THE MANUFACTURE OF CONFECTIONERY

spaced more widely apart than those which require simple setting or solidification.

### STARCH-PRINTING MACHINES.

The starch-trays, filled with clean, dry starch and smoothed over with a flat board, can be printed by taking the mould-board and pressing evenly and firmly and then removing the mould-board with a perfectly vertical lift so that the impressions in the starch are not in any way disturbed. The difficulty of withdrawing the moulds from the impression without moving the starch and consequently disturbing the perfection of the impression is sufficiently great to warrant the use of a Hand Starch Printing Machine by even the smallest confectioner making starch-dropped goods. The filled starch-trays are placed under the mould-board which is carried by a movable frame moving vertically up and down by means of a hand-lever and cam-action. There is an adjustable frame, too, which carries the starch-tray so that the tray may be kept level and hold the impression to any required depth. The mould-board is lightly tapped by a hammer worked off the cam-shaft while the moulds are down on the starch and when they are lifting clear, to make a clear and firm impression. From such machines it is no great step to the Patent Starch-moulding and Printing Machine which is practically the same device—power-driven—and therefore capable of greater output.

A still further refinement is the Combined Printing and Depositing Machine which performs both processes in one operation. The trays, filled with starch and strickled off as they come from the starch-cleaner, are placed on the table of the machine and carried forward under the printing frame by a chain with raised links. The whole tray is printed at once and is carried forward by the chain under the depositor and filled. A skip-motion is fitted to the machine to make up the space between two trays, and one complete row is filled at each stroke of the Depositing Machine. Both



COMBINED PRINTER  
AND DEPOSITOR

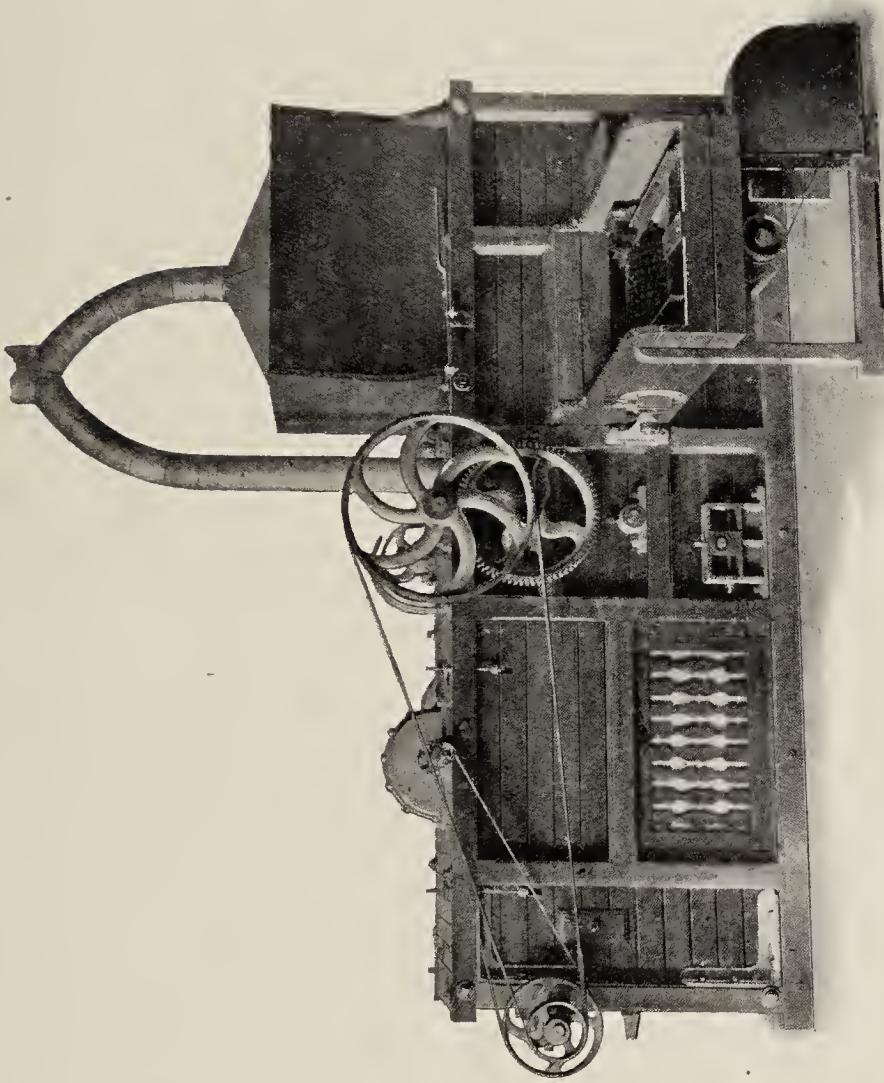
## THE MANUFACTURE OF CONFECTIONERY

operations are entirely automatic, and the attendant is required only to put the trays on to the machine and to take them off, when filled, passing them later to the drying-room.

### DEPOSITING MACHINES.

Stock fondant, warm jellies, etc., are melted up, and placed into the hopper of the machine which is provided with a steam or hot-water jacket. The starch-trays, after leaving the Printing Machine, are placed on the travelling band and automatically brought forward by a ratchet-motion under the discharge nozzles which fill one complete row of moulds at each stroke of the machine. An adjustable skip-motion is fitted to move the next tray forward into position for filling the first row when the last row of moulds on the preceding tray has been filled. The machine deposits equally well into starch-trays or rubber mats, and the goods, produced, have the important advantage of being absolutely uniform in size and weight. An alteration in the size of the deposit can be made with the greatest nicety in a few seconds whilst the machine is in motion.

Another depositing machine, the "Baker-Copland 'Simplex' Patent Confectionery Depositing Machine," is very largely in use by both large and small confectioners. This machine is specially designed to deal with marshmallows and similar sticky materials, so largely used for making banana-shapes, etc. The material is not subjected to any working whereby the lightness can be destroyed, and is deposited accurately into any shape of mould. The special attachment of a patent moving die is particularly useful in depositing long shapes such as the larger bananas, as the formation of "tails" between two rows of deposits is prevented. In addition to marshmallow and similar goods, the "Baker-Copland" Machine is equally useful for fondant-cream, jelly and gum depositing, whilst the output of the machine is sufficiently large to meet the requirements of most manufacturers. Fitted with a jacketted hopper and an



CONFETIONERY-CLEANING AND STARCH-TRAY FILLING MACHINE

## THE MANUFACTURE OF CONFECTIONERY

arrangement for altering the size of the deposit whilst the machine is in operation, the "Baker-Copland" provides the confectioner with the most efficient Depositing Machine on the market.

### DRYING-ROOM.

After depositing, the goods are removed in the starch-trays to the drying-room, which should be situated conveniently with the working-room or depositing-room on the one hand, and with the starch-room on the other. The doors connecting the three rooms should be sufficiently large to allow a trolley-load of starch-trays to be passed through conveniently. The starch-trays themselves are usually about 32 inches by  $15\frac{1}{2}$  inches, and are provided with wooden blocks at the corners at the bottom so that, standing square one on top of the other, they rest firmly, whilst allowing a free circulation of air.

The drying-room should be heated by steam-pipes to about  $104^{\circ}$  F. ( $40^{\circ}$  C.), and the hot air of the room should, as far as possible, be kept dry, as this greatly assists the drying-out of the starch and the goods.

It is hardly necessary to point out that the starch, when filled into the trays, should be dry and clean or that plenty of filled starch-trays should be kept handy to prevent the stoppage of the Depositing Machine, especially when gums and liqueurs are under treatment. Yet these details go far towards making a success of the starch-process, which, when properly worked, is the most satisfactory method yet known for obtaining clear-cut bon-bons of very great varieties of consistency.

The lighting of the starch-room should be by electricity, as a naked flame is dangerous in a room which may be filled with a fog of fine, dry starch by an accidental fall of a stack of starch-trays. Nothing but starch-dropped goods in their trays of starch should be kept in the drying-room, as such things as wet, blanched almonds and other partially prepared

## AUTOMATIC MACHINES FOR STARCH WORK

confectionery materials tend to add moisture to the air and so impair the drying efficiency of the hot room.

When the confections are set or dried to the required consistency, the trolley-load of starch-trays with the goods are removed to the adjoining starch-room, where the starch is separated from the confections, the former sieved and cleaned, the latter brushed and blown free from adhering starch.

### CONFECTIONERY - CLEANING, AND STARCH - TRAY FILLING MACHINE.

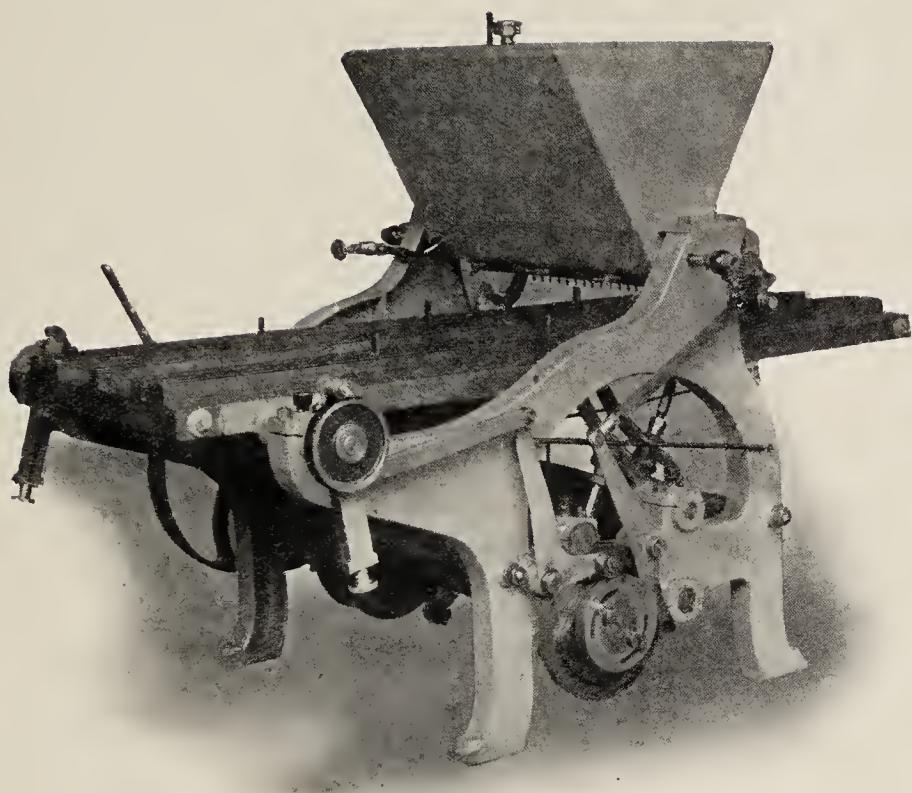
The use of starch for moulding confectionery necessitates the removal of adhering starch from the confections and a good sieving of the starch so that it can be returned to the trays ready to receive a fresh batch of deposited material.

It is not intended to describe the number of machines made for this purpose, but to detail only the principle of the process which has been adopted by the best confectionery houses as giving the most satisfactory results. Separation of the bon-bons from the starch, the treatment of the starch and the refilling of the starch-trays should be conducted in a separate room, called the starch-room, in close proximity to the depositing or working-room and the drying-room. The trays of starch with the deposited goods, after leaving the drying-room, where the necessary crust has been formed on the goods or a more complete drying-out accomplished, are emptied complete into the hopper of the machine illustrated —the “Double-sieve Patent Confectionery-cleaning and Tray-filling Machine.” The hopper is provided with a hood which prevents the dry starch from blowing about all over the room—indeed, this is one inconvenience of the starch-process and, unless proper care is exercised, may entail considerable loss of starch, besides being dirty and inconvenient. The emptied starch-tray is placed on the chain conveyor which carries it through the machine, where, in due course, it is filled again with sifted starch and strickled.

## THE MANUFACTURE OF CONFECTIONERY

The goods are prevented from passing too quickly from the first part of the sieve by means of an adjustable brush. From the first sieve the goods pass to a second semi-circular inclined sieve, with a retaining bottom brush. The pieces are brushed from the top by a brush extending the length of the second sieve, carried on radial arms, and a rocking motion is imparted to the brush by a crank. During the whole passage of the goods down the sieve they are subjected to a brushing motion from both sides. A regular oscillating motion is imparted also to the sieve by an eccentric cam, formed out of the solid steel-end shaft of the machine, and heavy gun-metal eccentric straps and connecting rods. The two sieves move in opposite directions at the same moment, so that the machine is balanced and vibration reduced to a minimum. The spring-feed appliance is a great improvement over the usual method of feeding in the trays for refilling, and many machines on the market cause considerable breakage of starch-trays through jamming in the machine. A fan may be fitted to the radial-arm brush so that air can be blown over the goods whilst they are being brushed, and this procedure is recommended for certain classes of goods. A suction-fan or dust-balloon can be used in conjunction with this machine, and a considerable saving of starch as well as of inconvenience, due to flying starch, can be thus made. It is important to note also that the treatment is very gentle, and that, whilst it may be desirable to make certain alterations to the design of the machine, shown, for the most delicate forms of bon-bons, fairly soft centres may be safely treated on these machines.

In considering later the "Mogul" combined starch machines it is desirable for the large confectioner to consider which system for his work is the most economical in practice. It is perfectly conceivable that a combination of two printers, four depositors and two cleaners may do more work in a more economical manner at a smaller outlay than the "Mogul" combination. The advantages of a combined,



“BAKER-COPLAND”  
CONFECTIONERY DEPOSITOR

## THE MANUFACTURE OF CONFECTIONERY

well-synchronised machine may, however, outweigh other considerations, and it is for this reason that the well-known "Mogul" is next described.

### THE "MOGUL" STARCH-FILLING, LEVELLING, PRINTING AND CANDY-DEPOSITING MACHINE.

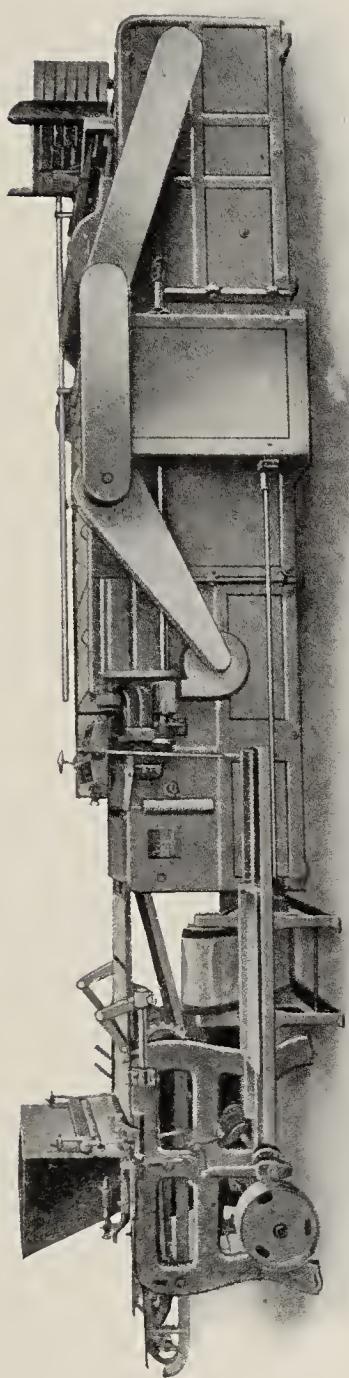
Whilst discussing the systems of candy-depositing in starch, it is essential to consider the "Mogul" machine, which is so well known to the large confectioner.

As the steel "Mogul" machines are built in quantity, the specialisation and concentration of trained men on the various operations of assembling become possible, and the finished device is perfect in mechanical detail.

The large steel "Mogul" performs the following operations with great efficiency :—

1. Automatically feeding uniform-sized boards containing starch and candy-centres.
2. Emptying the trays.
3. Cleaning the candy-centres and delivering same into trays.
4. Refilling the trays with starch.
5. Levelling the starch in the trays.
6. Printing the starch in the trays.
7. Depositing candy into the imprints, and delivering the trays, filled with freshly cast goods, for setting.

These operations are automatically and continuously accomplished by the steel "Mogul" with a great saving of labour and floor-space and with increased production, whilst there must necessarily be also a considerable saving in starch-room equipment. All dusty operations are performed within its enclosed compartments, permitting the work to be carried out under sanitary conditions for the employées and with a minimum loss of starch which is so often to be found on the floor between individual and separate machines when such are employed.



ALL-STEEL  
MOGUL

## THE MANUFACTURE OF CONFECTIONERY

The trays, filled with starch and set sweetmeats, are taken from the drying-rooms and stacked on the feeding device of the steel "Mogul." Thence they are automatically fed from the bottom, one at a time, on to a chain which conveys them to the dumping portion of the machine in which the tray is completely inverted and the contents emptied on to an agitating brush-lined sieve. The tray is then automatically brought back to a horizontal position and passes under a screen through which a volume of starch is continuously falling, brought from the base of the machine by means of buckets. From here the tray emerges perfectly filled, and, as it travels onward, the excess starch is automatically strickled off, leaving a smooth, top surface, whilst the outside of the tray-ends and sides are freed from any adhering starch by special brushing gear: the starch, so removed, is returned to the main starch-chamber of the machine. The tray then passes under the printer which, in much the same way as already described, makes imprints in the starch, and is then carried beneath the depositor, where the fondant, fruits, etc., are cast into the impressions. The finished trays, with their deposits, are delivered on to the extension of the depositor to be stacked for drying-off.

During the passage of the tray through the machine, the dried goods have been separated from the starch and cleaned, both by the brushes of the lower concave sieve and the swinging, adjustable air-brush, and have been delivered by a canvas conveyor into the receptacle placed at the side of the machine.

The completeness of the equipment and the continuity obtained by linking up the various operations, from the cleaning of the finished goods and starch to the easy handling of the freshly deposited material in trays, filled with clean starch, are, of course, very special attractions of the "Mogul" system. Many of the disadvantages of depositing fondants, fruits, etc., in starch are overcome, and the cleanliness of the "Mogul" combined operation leaves nothing to be desired.

## STARCH-DRESSING AND CONFECTIONERY-CRYSTALLISING

### STARCH-DRESSER.

In all factories using starch, the cleanliness and dryness of the starch are matters of great importance. As soon as there is the slightest sign of the starch congealing in small lumps or becoming mixed with small pieces of confectionery, the starch should be dried and dressed. The dresser, used, should be of such a nature that the starch or pieces of soft confectionery do not choke the meshes of the sieve. For this reason, a fine copper-gauze mesh is recommended as being most serviceable in use. On the other hand, if the starch is very dry and the pieces of confectionery hard, a silk sieve will be found serviceable, and an ordinary sugar-dresser would answer the purpose. It is advisable, however, to keep the starch-dresser for cleaning the starch only, and we do not recommend using a dresser, already in use in the factory, for other purposes.

### CRYSTALLISING.

The preparation of syrup for crystallising fondants, fruits, etc., is usually conducted in a Steam-pan of the general type, and care has to be exercised that the syrup on removal from the pan is of the correct density. All the vessels used should be kept scrupulously clean, and the finest sugar only should be employed. In addition to the Steam-pan, very fine hair sieves, large pans for holding the syrup when finished, skimmers, wire grids for holding the goods to be crystallised and flat crystallising pans for taking the grids, pieces and syrup will be required, whilst a rack, for holding the pans while crystallising is in progress, will be found useful. This rack can be arranged so that the pans can be placed in an inclined position for quickly draining off the surplus syrup after crystallising is completed.

### SUGARING.

The operation of sugaring is sometimes adopted for covering gums and fruits containing gelatine and is usually carried

## THE MANUFACTURE OF CONFECTIONERY

out in large sieves or in a Dragée Pan. The goods before sugaring are slightly steamed to make the surfaces sticky to hold the bright crystal-sugar dusted over the goods which are kept on the move until sufficiently covered. The sugared pieces should then be subjected to slight drying in a warm room before packing, otherwise there will be a tendency to sweat, with the probable development of mould and unsightly goods.

# MANUFACTURE OF LOZENGES

## Chapter III.

*Principles of Lozenge-Manufacture and the Machinery employed—Caramel, Jap and Nougat Mixers, Cutters, Cookers and Wrappers—Machinery employed in Liquorice-Work—Machinery employed in the Manufacture of Marshmallow and Beaten Gums—Machinery required for the Manufacture of Dragées.*

### LOZENGE MANUFACTURE.

THE manufacture of lozenges is a different process from any other that has yet been considered, in that it involves the preliminary preparation of fine, dry, powdered sugar with stearine, gelatine and the requisite flavouring which are compressed, or a dough made of sugar, gum, water and flavouring which is stamped out on a machine, and the lozenge subsequently dried. The first process may be termed "tabletting," the second "lozenge manufacture."

#### I. TABLETTING.

The Compressing Machine usually consists of a feed-hopper, which passes over a cavity made by movable dies, delivering the requisite quantity of material to be compressed, an upper and lower die and an ejecting apparatus for pushing away the tablets as they are formed. The feed-hopper slides over the cavity of the die which it fills with the powdered material, and, in sliding back, removes any superfluous powder from the face of the mould. The upper die is then lowered automatically in turn into the mould, and the material pressed to any required degree, the speed and degree of pressure depending upon the ingredients to be compressed. The compressed tablet is then raised by an ejector in the lower die and pushed out on to the ejector

## THE MANUFACTURE OF CONFECTIONERY

platform by the feed-hopper as it comes forward for the next filling operation.

### 2. MACHINERY EMPLOYED IN LOZENGE-MANUFACTURE.

The lozenge-dough is prepared by mixing together a solution of gum with fine, dry, pulverised sugar and flavouring in a Mixing Machine, the best type of which is unquestionably the "Universal" mixer, so well known to every baker and confectioner. When the ingredients are thoroughly incorporated, the dough is removed and either rolled into smooth sheets on the dough-brake or placed into the press which delivers a continuous sheet ready for the Stamping Machine.

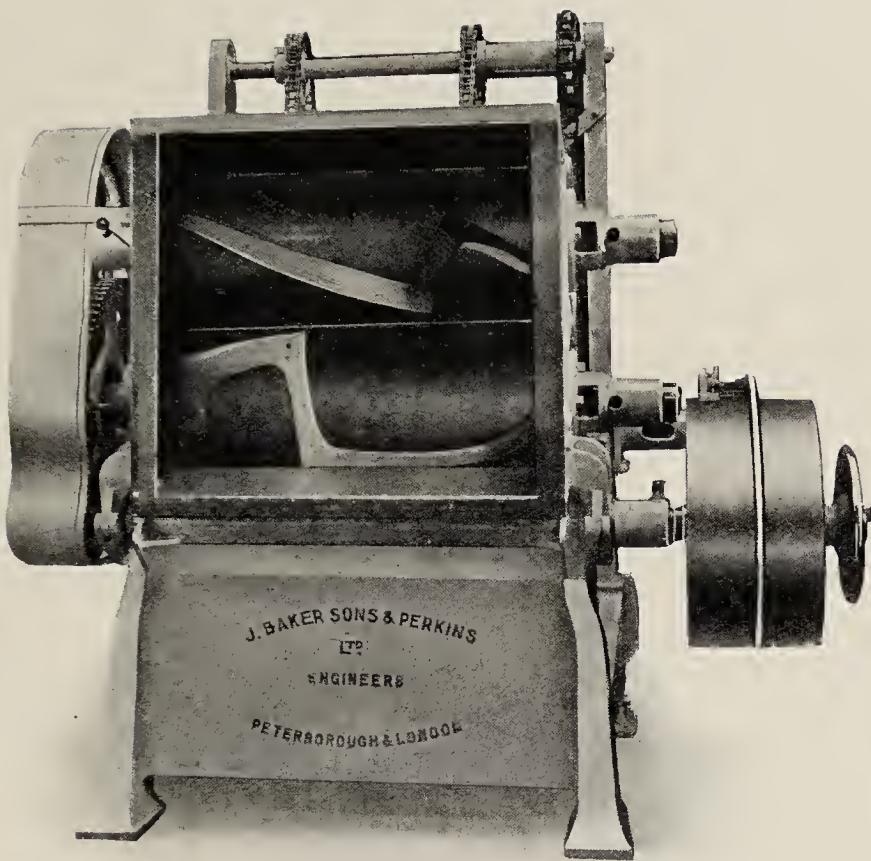
#### "UNIVERSAL" MIXER.

The design of the mixer is too well known to need much description. Sufficient to say that the mixing arms or kneaders work in opposite directions, and, from their special shape and motion in working, catch the dough at different points at each revolution, thus ensuring a very thorough mixing. The machines are made to tilt automatically or by hand, and so provide easy means of discharging. For lozenge-work, the mixers are specially brass-lined and fitted with polished brass mixing and kneading arms.

The "Texto" Lozenge Dough Mixing and Kneading Machine is another mixer very suitable for lozenge-doughs, and works on very similar principles to the "Universal."

#### IMPROVED REVERSING LOZENGE DOUGH-BRAKE.

This machine is designed for preparing the sheets of dough for the Lozenge-cutting Machines in places where the Improved Patent Sheet-delivering Machine is not used. The tables and rollers are lined with gun-metal, and all the gearing is machine-cut, giving greater precision and smoothness in working. They are also fitted with reversing gear and belt-striking gear.



“UNIVERSAL”  
LOZENGE MIXER

## THE MANUFACTURE OF CONFECTIONERY

It may be necessary or desirable to work the brake in conjunction with the Lozenge Pinning, Printing, Stamping, Embossing, Cutting and Spreading Machine, in which case it is recommended to use in addition the webbing, rollers and levers which are supplied separately to the brake.

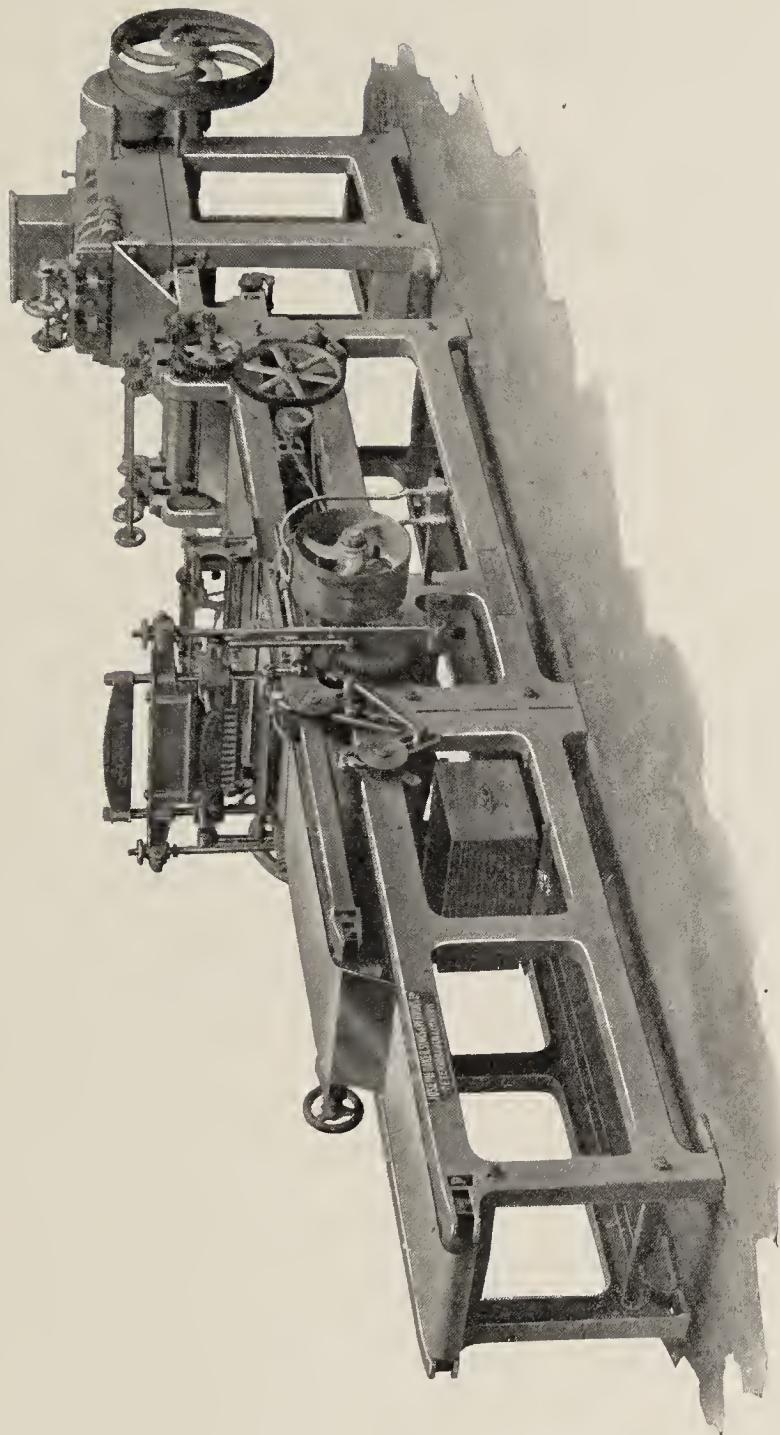
### THE NEW PATENT CONTINUOUS LOZENGE DOUGH-SHEET DELIVERING MACHINE.

This powerful machine produces continuous sheets of smooth-surfaced dough for lozenge-making, etc., and dispenses with the use of the brake. The dough is filled direct from the mixer without any further treatment to the hopper of the press which delivers a continuous sheet of any thickness desired. The necessity of good workmanship in the construction of such a machine is obvious. The one illustrated is made by Messrs. Joseph Baker Sons and Perkins Ltd., and is constructed to deliver sheets to fit their Lozenge-making Machine, which is next considered.

### BAKER'S PATENT IMPROVED LOZENGE-CUTTING MACHINE.

The Cutting Machine is usually worked in conjunction with the Sheeting Machine, already described, and is here so illustrated. The sheet of dough from the Sheeting Machine is delivered directly to the pinning rollers. A special flouring attachment is added to give extra smoothness and surface to the dough and, consequently, an additional gloss and finish to the lozenges. The dough passes, after smoothing, beneath the cutters which stamp out the shapes and deliver the cut pieces on to a moving web which then travels over a knife-edge, delivering the pieces evenly and without deformation on to the drying-trays travelling forward on a web under the end frame of the machine. The scrap is carried away by a separate web into a receiving box, to be used over again.

This machine is in use in some of the factories where the very best work is turned out, and its introduction has marked a great advance in the manufacture of lozenges.



LATEST LOZENGE MACHINE  
WITH SHEETER

## THE MANUFACTURE OF CONFECTIONERY

### CARAMEL, JAP AND NOUGAT MIXERS, BRAKES, CUTTERS AND WRAPPERS.

#### JAP AND CARAMEL MIXING MACHINE.

This machine consists of a strongly constructed Steam-pan fitted with beaters specially designed for heavy work such as jap and caramel mixings. The pan is of heavy copper with cast-iron steam-jacket, and the beaters can be easily raised for cleaning. The beaters or mixers revolve in opposite directions, and the hinged scrapers are so constructed that they clear the material from the sides of the pan as the beaters revolve. The machine is made with a tilt-pan with a lip or with stationary pan, as desired, and can be fitted with a bottom discharge at a slight extra cost.

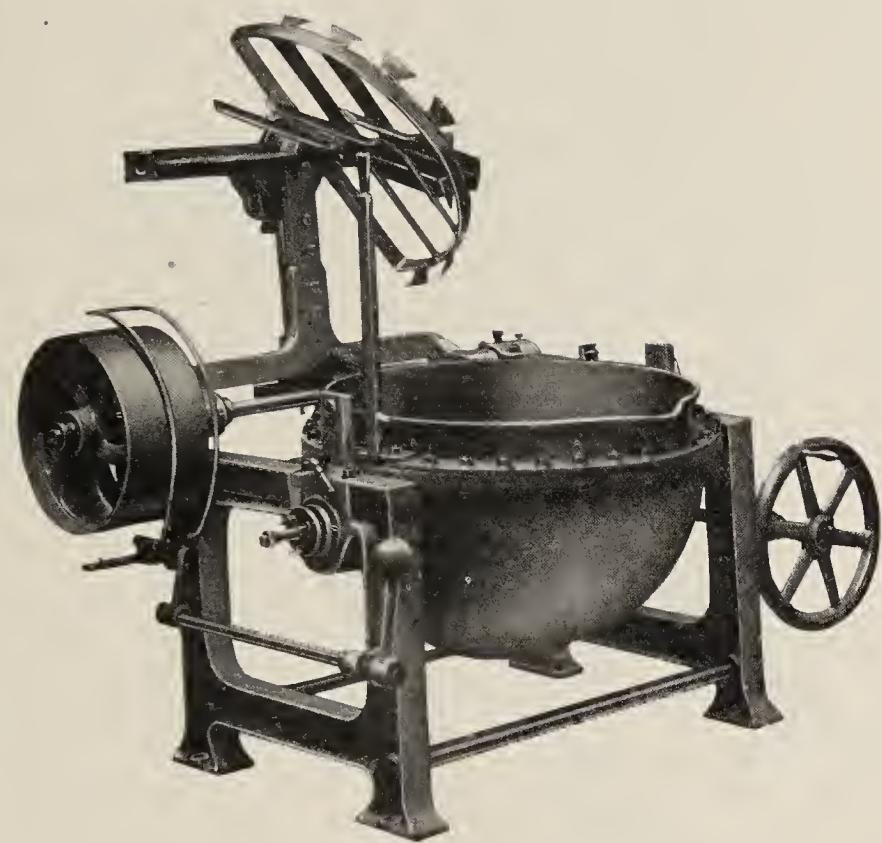
#### THE POWER CARAMEL-BRAKE.

For rolling sheets of caramel a powerful brake is required, and this has been met by several machinery makers in the designs of Power Caramel-brakes. The machine, illustrated, is very reliable and is suitable for the heaviest class of work, being fitted with strong helical gear-wheels. Fluted rollers are usually supplied with these machines and are specially suitable for rolling and gauging caramels, jap, nut-goods, etc.

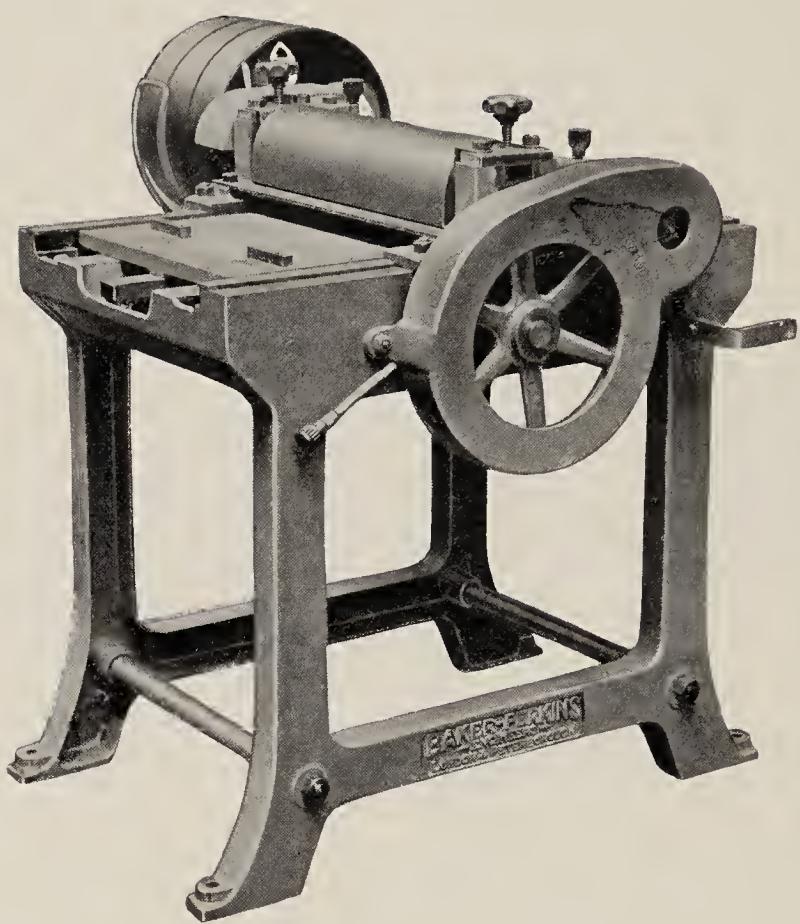
A similar brake of smaller construction has been designed to meet the needs of the small manufacturer, and can be supplied for either hand or power driving.

#### THE REVERSIBLE TABLE CARAMEL-CUTTING MACHINE.

This cutter is a powerful machine with a mechanically moving table which carries the sheet of caramel under the revolving cutter-knives, and is provided with fingers for holding the sheet down during the cutting operation. The machine has a reversing motion to enable the sheets to be cut in opposite directions and may be furnished with an



JAP AND CARAMEL  
MIXING MACHINE



THE REVERSIBLE TABLE CARAMEL-CUTTER

## CARAMEL CUTTING AND WRAPPING MACHINES

automatic stop which throws the machine out of gear at the end of the travel of the table. The Cutting Machine is simply and strongly designed and is giving satisfaction to all users in England and abroad.

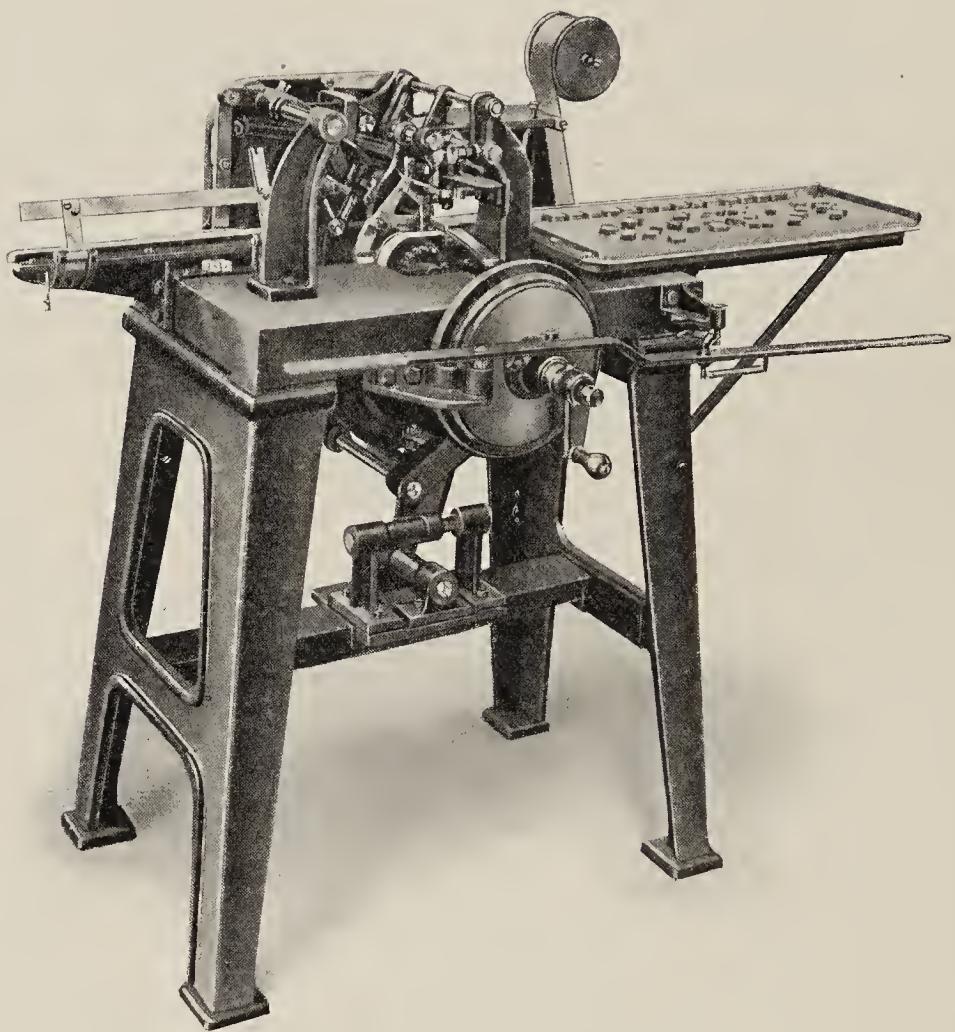
### NEW VERTICAL CARAMEL AND JAP-CUTTING MACHINE.

For such heavy work as cutting hard caramels and japs, the Vertical Caramel and Jap-cutting Machine is to be recommended. The machine is of very strong construction and is made with a simple vertical motion or to act with a shearing action also. Various machines are made with different widths and depths of cut, and the simplicity and strength of their design have caused general satisfaction to manufacturers in the jap and caramel-business.

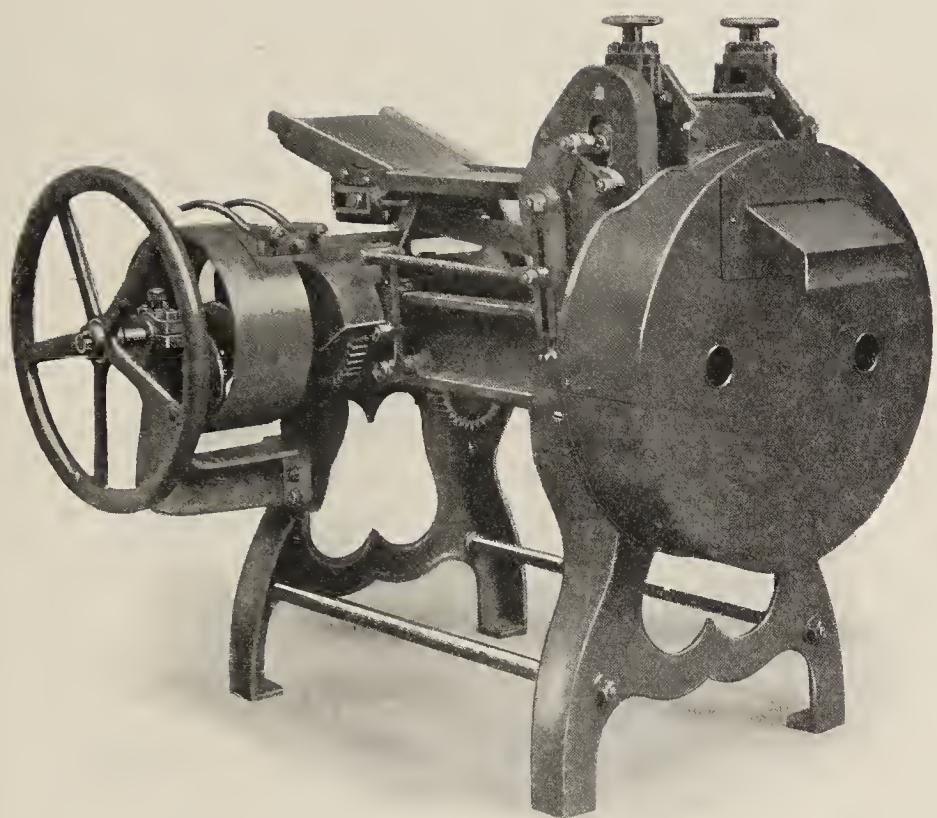
### THE " SAPAL " CARAMEL-WRAPPING MACHINE.

The Wrapping Machine which is shown in the illustration is one of the latest productions of the firm of Sapal (Lausanne), which has specialised so extensively in all kinds of wrapping-machines for the confectionery trade. The machines of this firm unquestionably lead the way in wrapping tablets, croquettes, neapolitans, etc., of chocolate, butter and margarine, bon-bons of all kinds, soap, biscuits, etc.

The difficulty of wrapping, in a neat manner, caramels of slightly irregular shape is notorious, and a machine for the purpose must possess the necessary simplicity and pliability if it is to meet the rather stringent requirements of caramel-wrapping. In the "Sapal" machine, these requirements have been met, and sweetmeats of dimensions from  $1\frac{3}{8}$  by 1 by  $\frac{1}{2}$  inches to  $\frac{5}{8}$  by  $\frac{5}{8}$  by  $\frac{1}{4}$  inches can be wrapped at the rate of 100-150 per minute on this machine, which weighs slightly under one cwt. One operator only is required, and the total horsepower for driving the machine is only  $\frac{1}{4}$  h.p. The goods are wrapped in three distinct operations and are, at first, fed on to a travelling band, which conveys them towards a



THE "SAPAL" CARAMEL  
WRAPPING MACHINE



NOUGAT  
CUTTING MACHINE

## THE MANUFACTURE OF CONFECTIONERY

horizontal plunger which, in turn, passes them on to a conveyor-wheel. The goods, neatly wrapped, are delivered into a canal ready for the packers.

### NEW PATENT NOUGAT-CUTTING MACHINE.

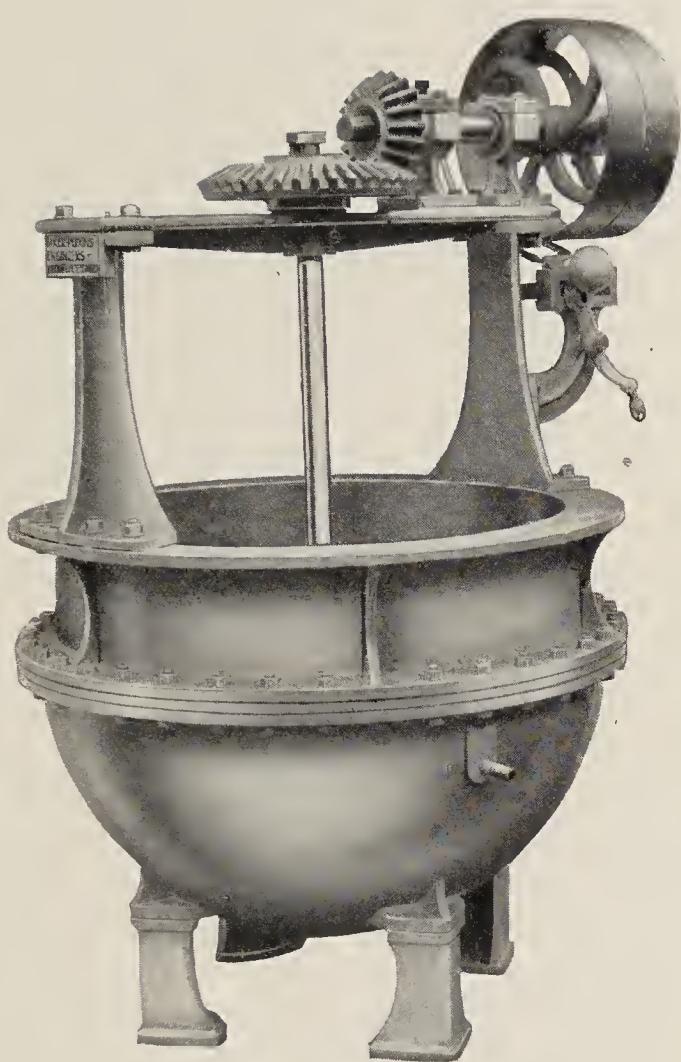
Owing to the difficulty of cutting nougat, which is almost invariably of a highly sticky nature, special arrangements have to be made in the design of a power-driven cutter for this purpose. The difficulty has been overcome in the Patent Nougat-cutting Machine, illustrated, which is powerfully built and specially recommended for this class of work. The output is very large, and, when the machine is working at full speed, two or three attendants are kept busy in receiving the cut pieces.

### MACHINERY EMPLOYED IN LIQUORICE-WORK.

There are two classes of liquorice goods—dropped, and cut or pressed. In the former case, the procedure is much the same as for fondant-dropping, and little other apparatus is required. For the latter, strong mixers and cutters or presses are essential.

There is no need to consider the “dropped” liquorice goods here, as reference to the recipes will show that the operations of mixing and depositing are precisely the same as for fondant-work, with a difference in ingredients which require special preliminary preparation.

As a rule, gums are prepared in a similar way to the “dropped” liquorice goods, and the same machines are required for both as for the preparation of fondants—*i.e.* small and large Steam-pans, Depositing Machines, Starch-printing Machines, Starch-cleaning and Starch-separating Machines, Crystallising Apparatus, etc., as well as the use of a separate drying-room heated to 104° F. (40° C.) for jujubes and moulded cough-drops, etc. For certain classes of gum goods, the Beating Machine or Whisk is required, but



LIQUORICE PAN AND  
MIXING MACHINE

## THE MANUFACTURE OF CONFECTIONERY

this is considered under marshmallow-work in the next section.

For the preparation of hard liquorice pastes suitable for the manufacture of liquorice shoe-laces and fancy pipe-shapes, a strong Combined Mixer and Steam-pan is necessary as well as a Liquorice Press.

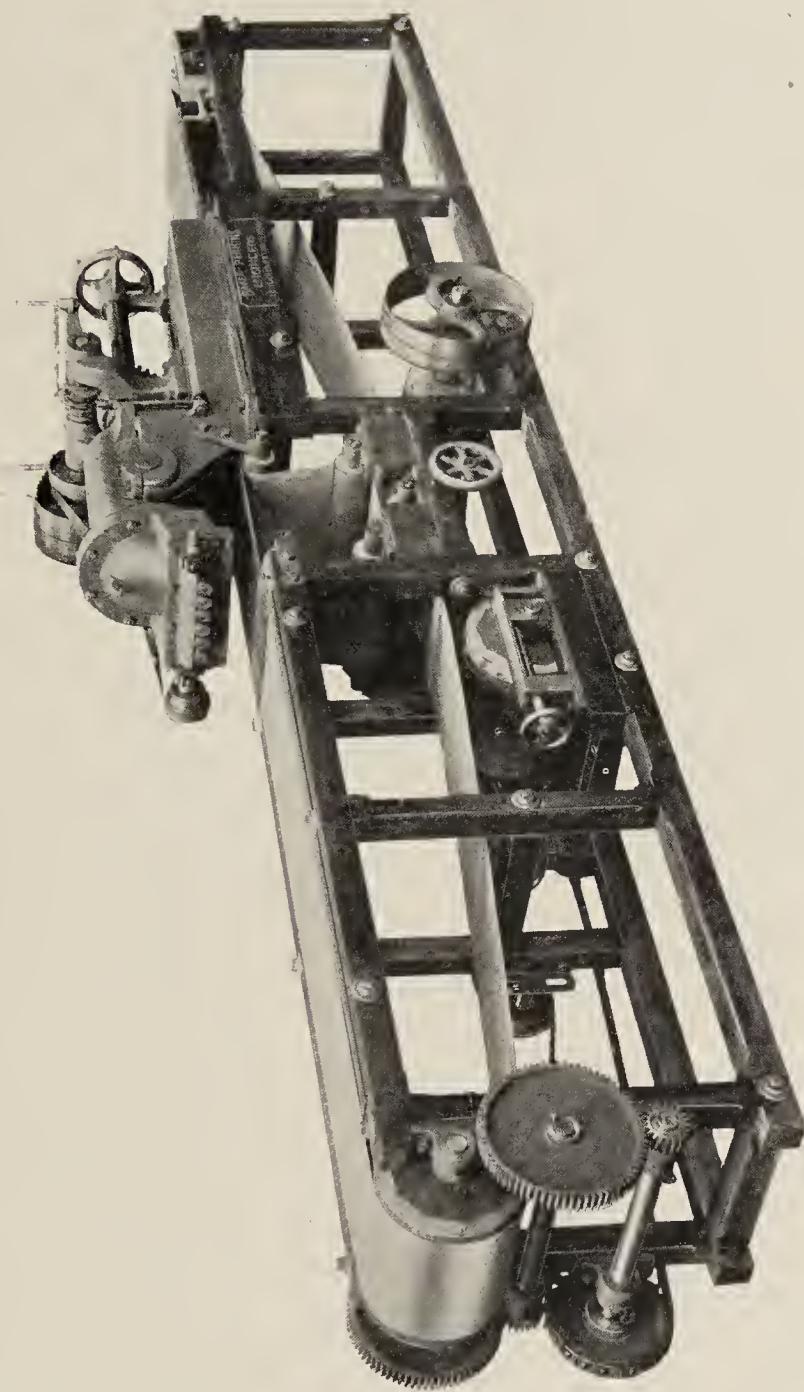
### COMBINED LIQUORICE-MIXER AND STEAM-PAN.

This machine is similar in several ways to the strong Mixer and Steam-pan described already for the preparation of japs and caramels. The mixer for hard liquorice pastes must, however, be of the strongest possible construction, and the illustration shows a machine with mixers or stirring arms made on the heaviest principle. The arms can be made to revolve in opposite directions, and the machine is built in several sizes to meet the needs of all manufacturers.

### LIQUORICE-PRESS.

In the machine illustrated, the Press has been shown in an inclined position and accompanied by conveyor-bands for taking away the pressed goods. It will make solid, flat, or hollow sticks, and is fitted with an attachment for cable, or twist, or crimped work. The head of the press is fastened to the cylinder by hinged bolts and can be removed in a few minutes for recharging or cleaning.

The cylinder holds a charge of about 55 lb., and presses the goods out from the dies on to trays which are carried through the machine by an endless band travelling at the same speed as the goods themselves. The speed of this band is controlled by a cone-pulley drive and is capable, therefore, of fine adjustment, so that the goods need never be stretched or otherwise misshaped. For hollow sticks, a blower is required, and this is provided and attached to the press at an extra charge by the manufacturers of the machine.



INCLINED HEAD LIQUORICE PRESS  
WITH FRAMES, CONVEYOR BANDS AND CONE

## THE MANUFACTURE OF CONFECTIONERY

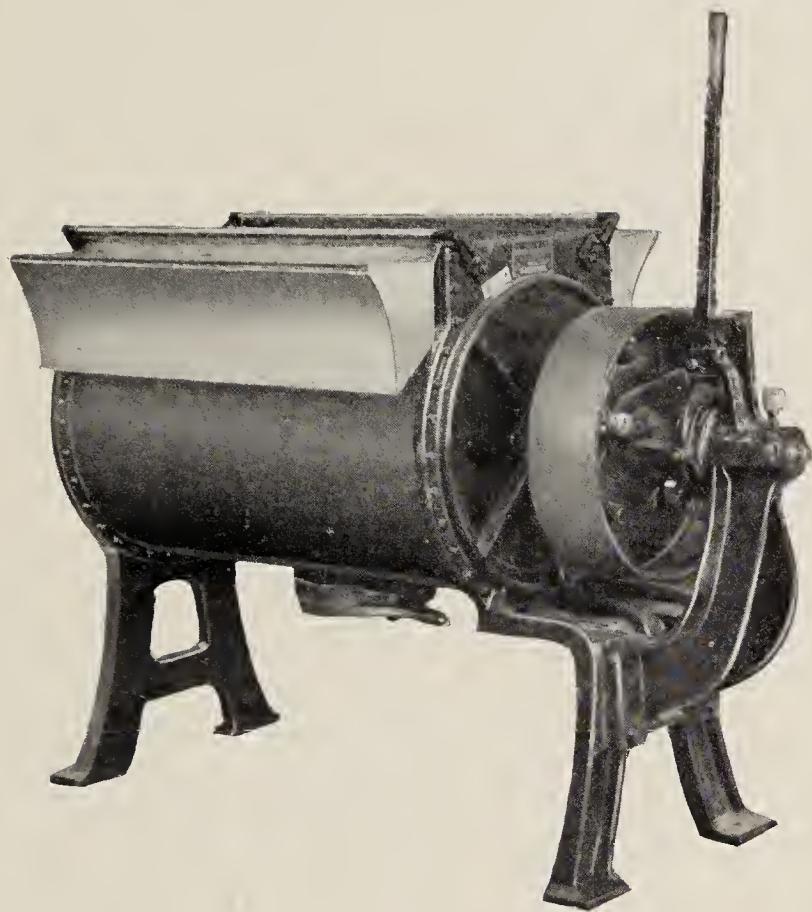
### MACHINERY EMPLOYED IN THE MANUFACTURE OF MARSHMALLOWS AND BEATEN GUMS.

There are many confections in which gum, albumen, egg-whites, or gelatine are used, of a light frothy consistency. Among these may be mentioned marshmallows, bananas, meringues and certain light nougats as typical of this class of goods. In order to obtain the necessary lightness, the gum, albumen, etc., have to be beaten to a froth with sugar, glucose, etc., in a whisk, and very much of the success of the result depends upon the nature and time of whisking. According to the type of goods required, the Whisking Machine should be selected for rapid beating, creaming, stirring and so on, and there are on the market a very large number of machines from which the selection can be made.

The best modern machines, however, will serve all the purposes mentioned, and it only remains to select one or other of the approved makes. In making the selection the confectioner should remember that the most violent or rapid action is not always the most satisfactory, for, quite frequently, machines are put on the market which, by the very violence of their motion, defeat the end in view. It is easily possible to destroy the natural strength and elasticity of eggs when beaten over-much or with too great violence.

The ingredients to be handled should be carefully considered when purchasing a whisk, liquid albumen and egg-whites, for instance, requiring more rapid beating than, say, cake-batters. The ideal machine is, therefore, one that can be adapted to suit all likely requirements and, in the "Ova-mixa," described below, it may be confidently asserted that such a machine may be found.

The simplicity of design of a Whisk is of great importance, and it should be possible to clean every part of the container and the blades with greatest ease. Further, the container



THE SPRINGFIELD  
MARSHMALLOW MIXER

## THE MANUFACTURE OF CONFECTIONERY

of the perfect Whisk should be capable of being heated so that the ingredients undergoing treatment can be brought to any required temperature during whisking.

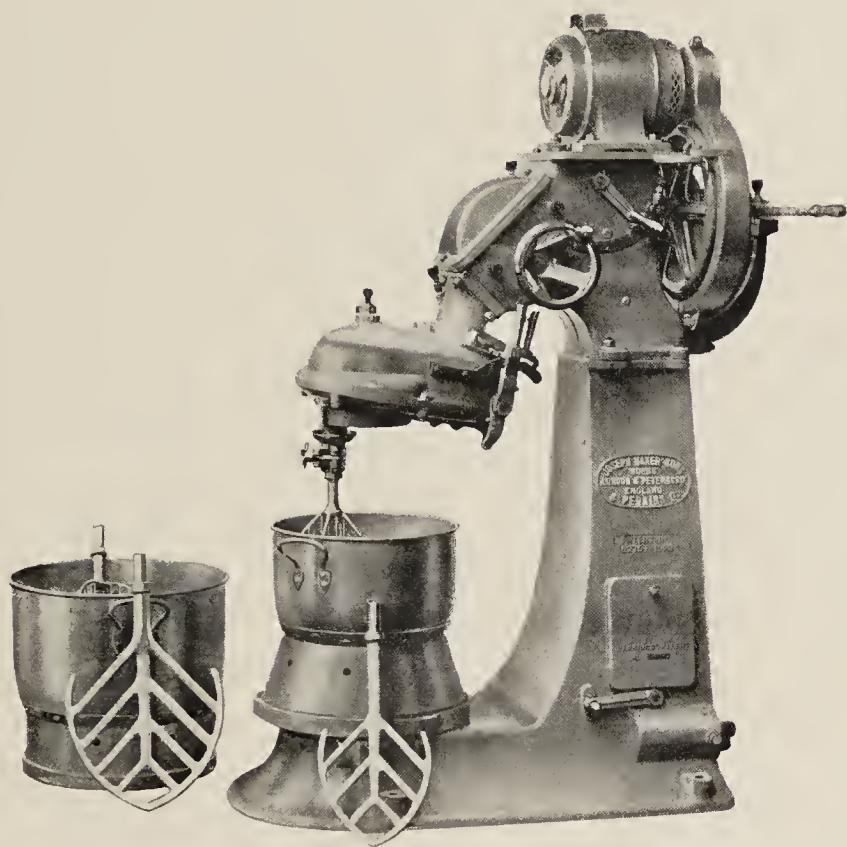
For mixing and beating eggs, sponge-cake mixings, rice and sponge biscuits, meringues and other albumen or gelatine mixings, the "Morton" Patent Whisking Machine with tilting gear is excellent. This can be supplied for hand-driving or power-driving and is, therefore, available and serviceable for both small and large confectioners. The pans are fitted with tilting gear on the power-machines, by means of which they can be discharged of their contents without dismounting or stopping the motion, a convenience to large manufacturers as the work can be allowed to go on continuously. Since a hot-water jacket is fitted to the "Morton" whisk, the temperature of the ingredients during whisking, a factor which plays so important a part in the manufacture of the best beaten confections, can be easily controlled.

### THE " OVAMIXA."

For beating eggs and similar materials, the "Ovamixa" is probably unique. This machine embodies all the latest improvements in design of a speedy, adjustable beater with every convenience for quick changing and cleaning. The bowl itself revolves and can be either of small or large size to fit the same stand, whilst a gas-ring, placed beneath, provides any heat that may be necessary. The beaters are of different sizes and are attached to an arm, the angle of which can be adjusted to give greater or less beating effect. The beaters can be quickly removed for cleaning purposes.

### DRAGÉE WORK.

Though the finest dragées are still made by hand in a very laborious manner, the process can be accomplished with excellent results by the use of machinery in the form of Revolving Pans, which, having steam-jackets or steam-pipes



THE "OVAMIXA"

## THE MANUFACTURE OF CONFECTIONERY

surrounding them, can be used for quite a number of the drying-out operations formerly carried out in the drying-rooms in the more lengthy hand-process. One point worth noting is that the dragée-room should not be too hot especially if chocolate-coating is likely to be used there.

### THE COPPER-COIL REVOLVING STEAM-PAN AND THE PERFORATED REVOLVING COPPER COMFIT-PAN.

There is a great deal to be said in favour of a Perforated Revolving Pan for dragée-work, as it saves the sifting of the goods when finished. At the same time, the advantages of heat applied to the pan as it revolves may be said generally to outweigh the other consideration. In the coil-pan the steam-coils are placed round the middle of the pan, leaving sufficient space for perforation above and below the steam-coils. Generally speaking, this is a better type than the steam-jacketted pan for most types of dragée-work, though if required, a steam-jacket can be supplied to replace the coils.

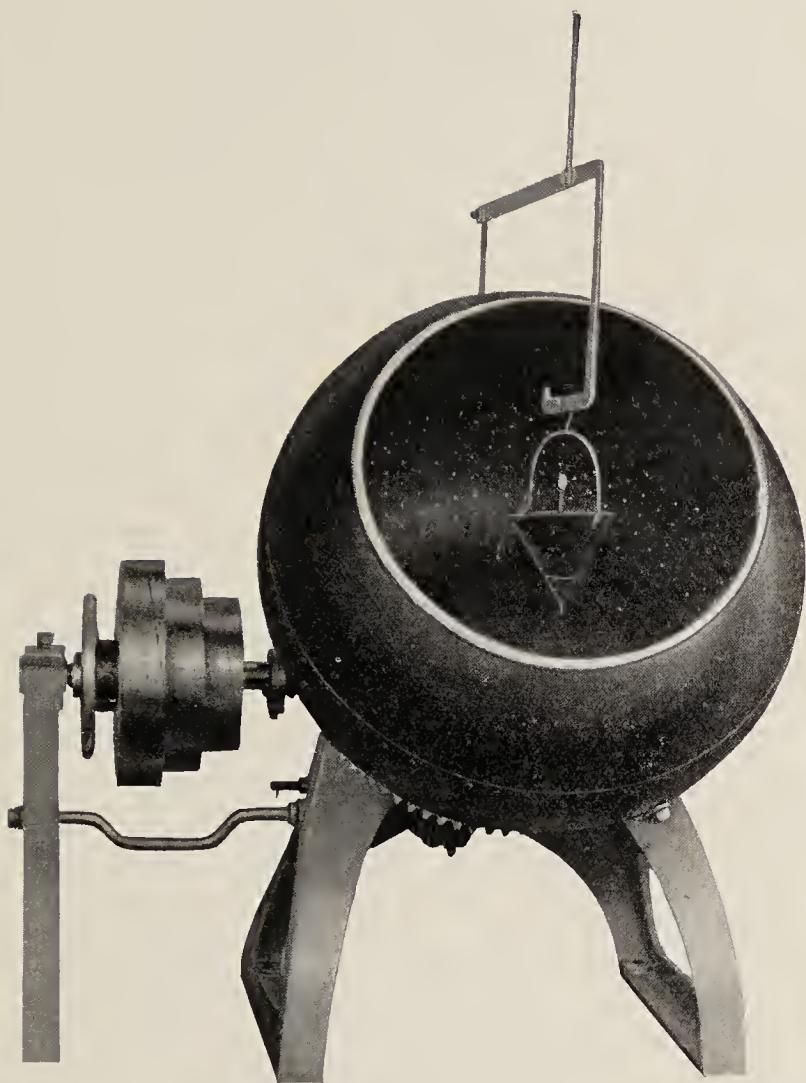
For pearl-ing-work the latter is possibly preferable, though manufacturers will, of course, suit their own convenience, born of experience.

### THE REVOLVING SILVERING AND THE POLISHING MACHINES FOR COMFITS, ETC.

In the preparation of any quantity of silvered goods, the Revolving Silvering-pan, of which the globe is made of strong glass, is an essential. The Silvering-pan, illustrated, can be worked either by hand or by power, and the glass globe is supported to reduce to a minimum the chances of breaking.

The Polishing Machine is also made for either hand or power-drive. The frame of the drum of this machine is covered with canvas, and the arrangement is designed to secure efficiency of result as well as saving time and labour.

Excellent results can be obtained with this machine in the preparation of chocolate-coated almond drageé.



PERFORATED REVOLVING  
COPPER COMFIT PAN

# THE MANUFACTURE OF CONFECTIONERY

## Chapter IV.

### MACHINES USED FOR PRELIMINARY PREPARATION OF INGREDIENTS.

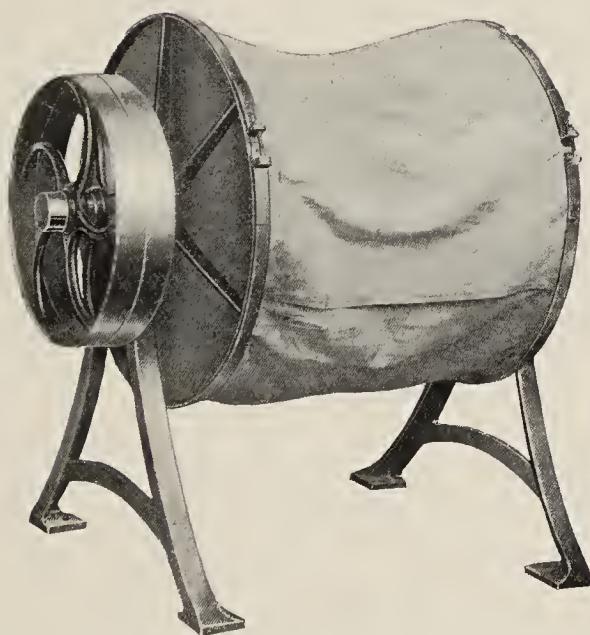
*Sugar-Disintegrators and Sifters—Almond-Separators, Sifters, Blanchers, Peelers and Mills—Cocoanut-Graters and Ring-Cutters—Presses and Filters for Fruit-Juices, etc.*

### SUGAR—DISINTEGRATORS AND SIFTERS.

THE sugar of commerce, sucrose, usually reaches the confectioner in bags as white crystals known as “granulated sugar.” Of granulated sugars there are a number of grades, ranging from the finest white to the dirtier grey or brown which characterises plantation-washed sugars and many qualities, such as Java and Mauritius. For the preparation of the finest, white fondant or lozenges, the highest grades of sugar should be used, and, though in the former case, as in all instances where the sugar has to be melted, the crystals can be used direct, for the manufacture of lozenges and many other classes of confectionery the sugar has to be ground to a fine powder, known as “lawn” or icing-sugar. When, however, finest, white preparations are required, the sugar solution is better filtered, to remove pieces of hair and sacking which considerably detract from the brightness and finish of the completed article, and there is very much to be done yet by the confectioner, both large and small, in utilising a vegetable carbon such as “Norit,” which has been proved in practice to be a wonderfully efficient decolouriser. There is no room here to describe the process of decolouring, nor more than to mention the advantages to be derived. Briefly, by



REVOLVING  
SILVERING PAN



POLISHING MACHINE

## THE MANUFACTURE OF CONFECTIONERY

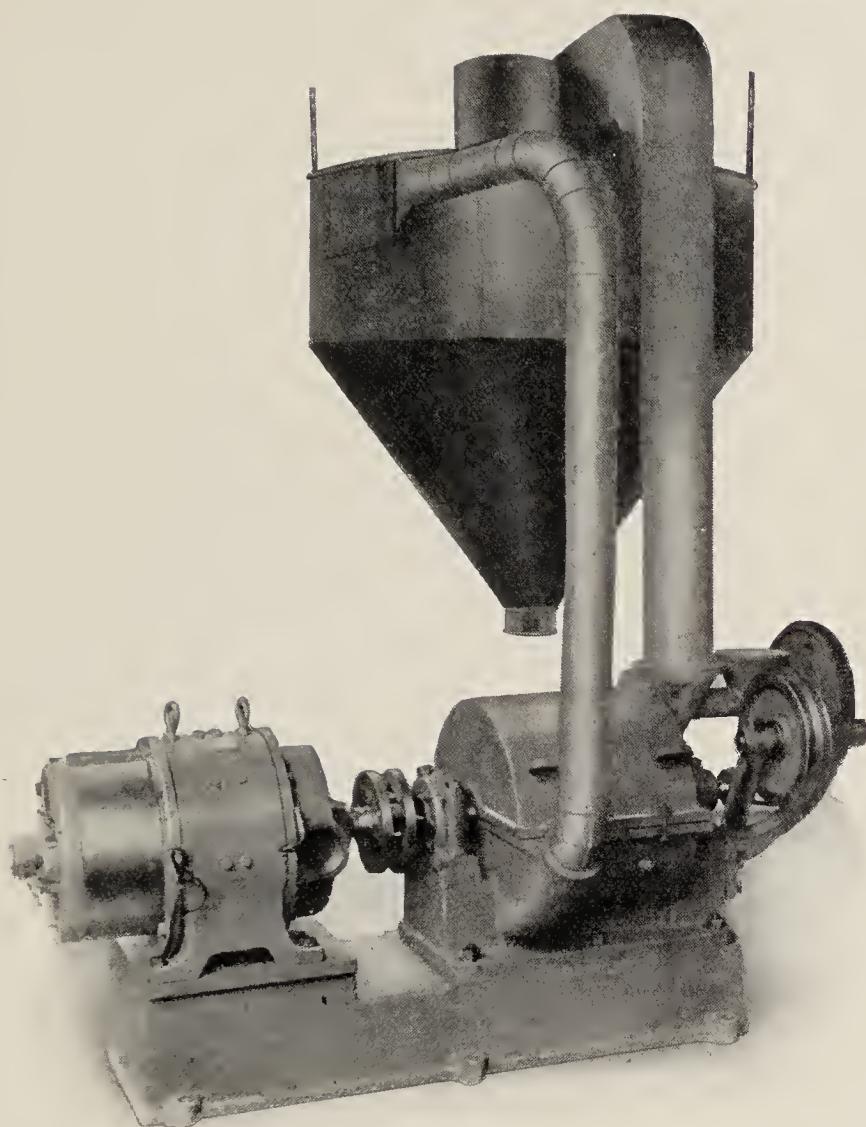
filtration through "Norit" of a syrup made from plantation-washed sugars which always give a very cloudy and brownish solution with water, a perfectly crystal water-white syrup can be obtained, which excels in brilliance and freedom from colour a solution of the same strength of the highest grade of granulated refined sugar. The use of "Norit" is indeed a refining operation, and the syrups resulting from such treatment are unequalled by syrup made from any high grade sugar on the market for fine, white fondant and similar goods which owe their attractiveness to immaculate whiteness. It is hardly necessary to point out that the process is cheap in operation and that a considerable saving over the use of the highest grades of sugar is secured. Worked in conjunction with the "Amorphous" Sugar Plant, already briefly described, raw sugars can be clarified and decolourised to some extent, the resulting sugar after "transformation" being eminently suitable and economical in the manufacture of the highest class of smooth chocolate, couverture, etc.

### THE " WOODBURN " PATENT SUGAR-DISINTEGRATOR.

This machine has been designed to produce in one operation the finest icing-sugar, commonly employed in the preparation of lozenges, chocolates, etc., though, with a suitable separating chamber, several grades of sugar can be separated. The most usual course is to make use of the pneumatic separator to give only the finest grade of sugar, as in this way sifting and other supplementary processes are avoided.

Though designed for sugar, the "Woodburn" can treat cocoa-shell, etc., with equal facility, and, as the machine is strongly built, its output large and the fineness of the product capable of easy regulation, the machine falls among the indispensables of a well-equipped factory.

Wherever possible, it is recommended to have a direct drive from a separate electric motor which can be fixed with the disintegrator on to a solid bed-plate. In the illustration shown, the machine is driven in this way, the motor and



ELECTRICALLY DRIVEN IMPROVED  
“ WOODBURN ” PATENT DISINTEGRATOR  
WITH PNEUMATIC SEPARATOR

## THE MANUFACTURE OF CONFECTIONERY

disintegrator being connected by a flexible coupling. The pneumatic separator is also shown attached to the machine, with outlet at a suitable height for delivering the powdered sugar direct into bags.

### SUGAR-MILLS.

There are other types of Sugar-mills which may be used with good results. These are generally based on the grinding system, and the resulting powder has to be passed through a sifter in order to secure uniformly finely-divided icing-sugar.

“ AMORPHOUS ” OR “ TRANSFORMED ” SUGAR-MACHINE. (See Chapter I., pages 30 and 32.)

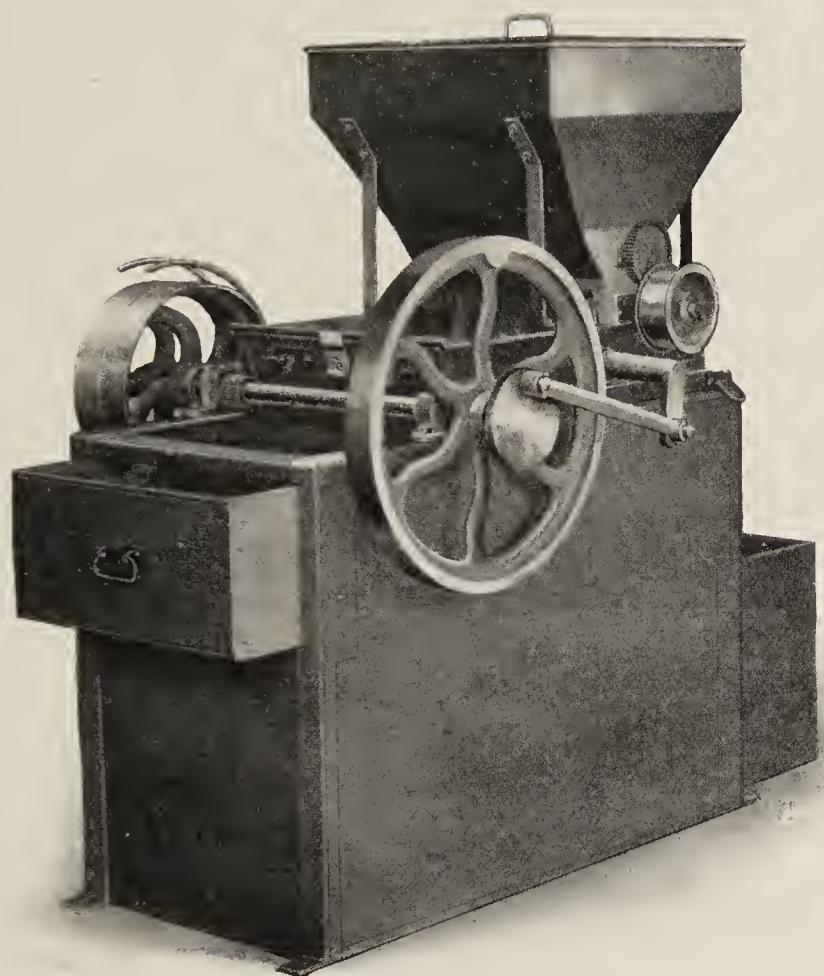
### SUGAR-SIFTERS OR DRESSERS.

The best type of Dresser consists of a hopper into which the powdered sugar is fed, a revolving cylindrical sieve covered with fine-meshed silk, and receptacles in the form of discharging hoppers or drawers into which the sifted sugar falls. Machines of this type can be obtained in all sizes.

The other type of sifter is the rocking-sieve, the principle of which is usually adopted for smaller machines to be worked by hand.

### ALMOND-SIFTING AND SEPARATING MACHINES, ETC.

The almonds of commerce often contain pieces of shell, stones, dirt and sacking from which it is necessary to rid them before using in confectionery, etc. Besides, when an Almond-blanching Machine is used it is better to grade the almonds into uniform sizes. To accomplish this a simple jigger-sieve is used, beneath which are placed, under the various sizes of mesh, a number of drawers or receptacles according to the number of grades. These machines can be obtained for either hand or power-drive.



SUGAR SIFTER

## THE MANUFACTURE OF CONFECTIONERY

Previous to the blanching and grinding the almonds must be scalded to soften the husk, which is then easily removed in the Almond-blanching Machine.

### ALMOND-BLANCHING OR PEELING MACHINE.

A good form of machine for this purpose is illustrated. It consists of four rollers set in pairs, through which the almonds pass. The rollers are geared differently, and the almonds, in their passage through, receive a different treatment in each pair. It is also fitted with a canvas web for absorbing moisture and is complete with a husk-gatherer. The machine, shown, will perfectly blanch all kinds and shapes of almonds in one operation and is in use in most of the best factories.

### ALMOND-MILLS.

In the preparation of marzipan and other confections requiring finely ground almonds, almond-meal, etc., Grinding Mills are necessary. These mills usually consist of granite rollers, through which the blanched almonds are passed and ground. The rollers are adjusted by hand-wheels, so that one or two reductions of the almonds can be made if required.

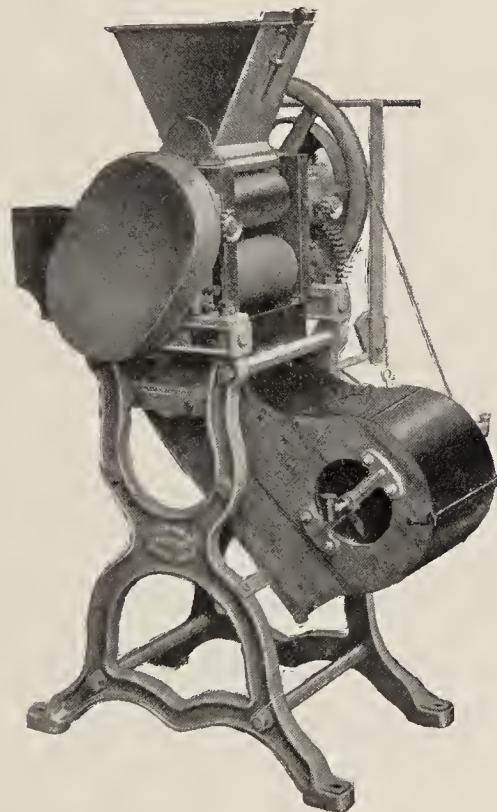
Such a mill as that illustrated will reduce almonds to a fine paste, though, if the smoothest marzipan is required, the larger Marzipan-refining Machine will be required. In the latter machine, the rollers are of granite but larger than in the simpler Almond-mill, and the crushing and grinding are more complete. Any chance of over-heating, such as might occur in grinding the paste in the presence of sugar, is completely overcome.

### ALMOND-SLICING MACHINES, ALMOND-SPLITTING MACHINES, ETC.

Many such machines may be required by the confectioner, and it is advised that a reputable manufacturer be approached when it is intended to make purchases of machines of this nature. There are so many types of these machines on the



ALMOND SIFTER  
AND SEPARATOR



FOUR-ROLL  
ALMOND BLANCHER

## THE MANUFACTURE OF CONFECTIONERY

market that accomplish the desired result to a more or less degree that considerable discretion in a purchase should be exercised, otherwise the confectioner will find himself in possession of a "white elephant."

### COCOANUT-GRATERS, ETC.

In confectionery, desiccated cocoanut is very largely used for macaroons, cocoanut-ice, etc. The confectioner can usually obtain any grade of cocoanut that he requires, such as cocoanut-flour, fine cocoanut, coarse cocoanut, cocoanut-rings, and so on. Machines have been devised, however, for preparing from the hulled nut or copra any grade of cocoanut for use by the confectioner. In the Cocoanut-grater, illustrated, the hulled nut is fed into the hopper of the machine upon an adjustable grid, through which fine-pitch, circular, revolving saws protrude. These saws grate the cocoanut clean without crushing it. Such a machine can, of course, be used for grating other kinds of fruit, vegetables and roots.

### COCOANUT-RING CUTTING-MACHINE.

In this machine the whole nuts, after hulling, are fed in at one end where they meet a device for cutting the nuts into slices, fine or coarse, as desired.

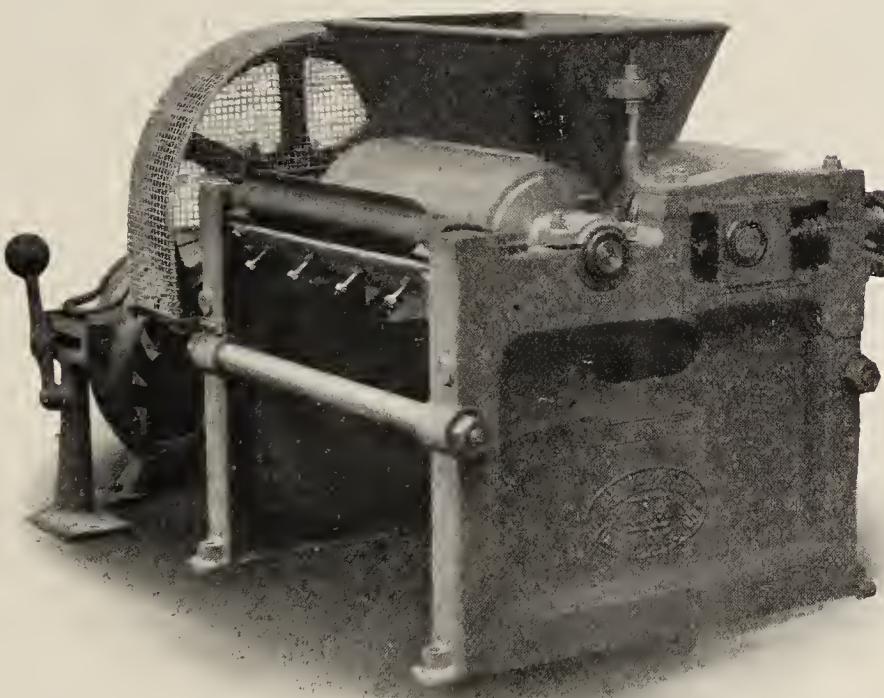
### PRESSES FOR FRUIT-JUICES, ETC.

The most efficient presses are undoubtedly those fitted for hydraulic power. The system is simple, consisting of substantial ram-pillars and pan for gathering and discharge of the material pressed out. The presses can be fitted with hand-lever or with power-pump as required.

The Special Hydraulic Press, also illustrated, is a most efficient apparatus for expressing juices from fruits and for other expression work such as pressing olives, limes, cacao-



THREE-ROLL GRANITE  
ALMOND MILL.



MARZIPAN REFINER

## THE MANUFACTURE OF CONFECTIONERY

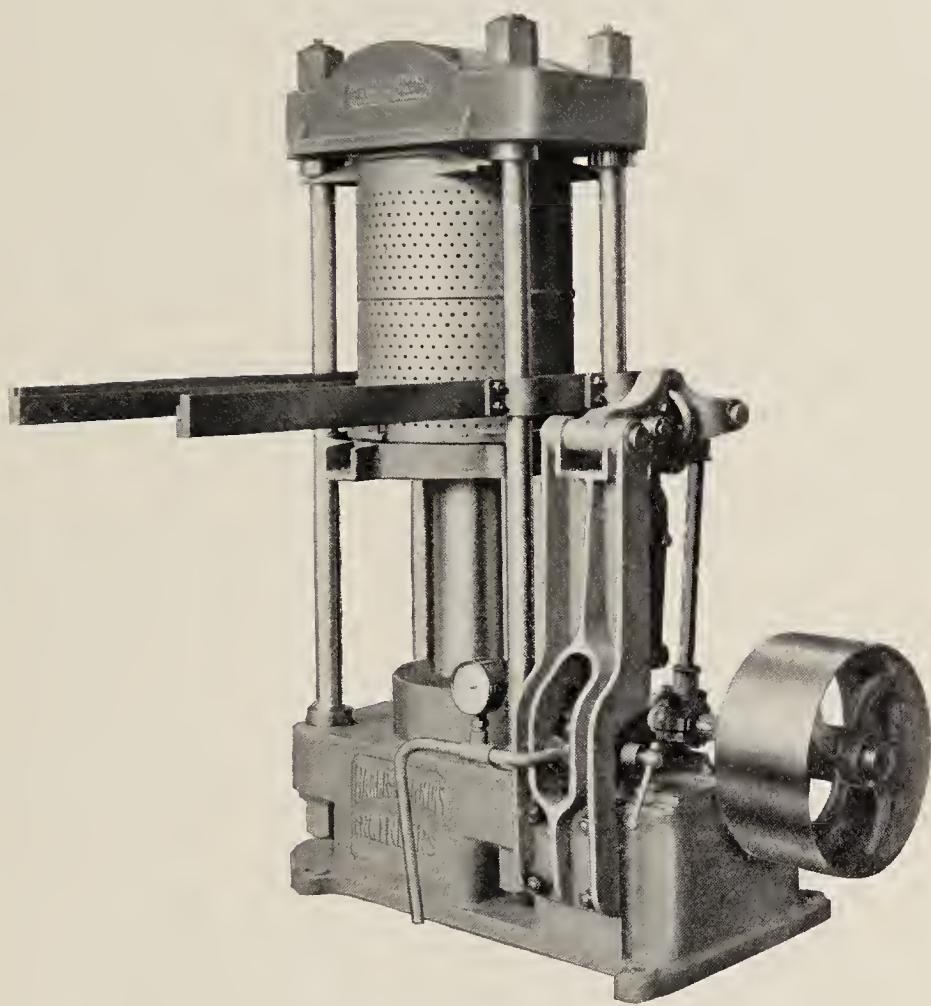
nut, etc. It is strongly constructed, with solid ram and gun-metal box. The pump is for power, and the press is usually made with a box, to slide out on rails for discharging, and with fixed mullets, and is so supplied by the manufacturers unless otherwise ordered, though, when required, it is made with a movable mullet, as shown in the illustration.

For the manufacture of cider, Apple-graters and special Cider-presses are recommended.

### FILTERS FOR FRUIT-JUICES.

When the fruit-juice leaves the hydraulic press, it requires straining or filtration to secure clearness and to free it from floating impurities.

A very satisfactory filter is that illustrated, showing a copper framework in which are three copper sieves of gradually increasing fineness. At the bottom of this is a felt-bag which will retain the finest matter in suspension. The sieves or strainers are made for quick discharge and are readily cleaned.



HYDRAULIC PRESS  
FOR FRUIT, WITH PUMP

# THE MANUFACTURE OF CONFECTIONERY

## Chapter V.

### RECIPES.

THE recipes, next given, follow broadly the system existing in the preceding chapters, and fall, therefore, under the headings :—

#### 1. BOILED-SUGAR GOODS.

- (a) Hard-boiled Goods.
- (b) Toffees, etc.
- (c) Pralinés.
- (d) Fondant.
- (e) Fruit-pastes and Jellies. Preserved Fruits.

#### 2. PLAIN SUGAR GOODS CAST IN STARCH, ALSO CRYSTAL FOR CRYSTALLISING FONDANTS, FRUITS, VIOLETS, ETC.

- (a) Liqueur Bon-bons.
- (b) Hollow Sugar Goods, Bijou-pastilles, etc.
- (c) Crystal.

#### 3. GOODS REQUIRING SPECIAL MACHINERY OR APPARATUS OTHER THAN THOSE GIVEN IN 1 OR 2.

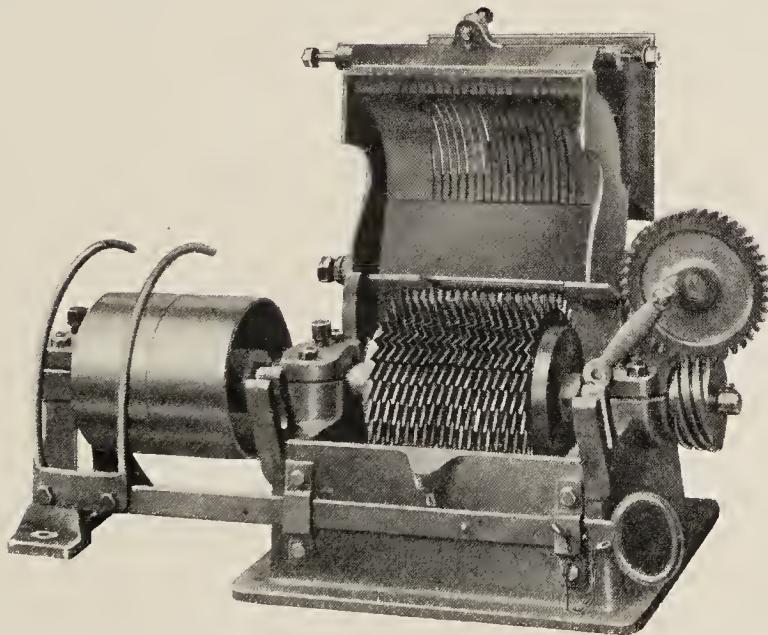
- (a) Lozenges (Compressed and Paste).
- (b) Caramels.
- (c) Nougat.
- (d) Liquorice Goods.
- (e) Marshmallows, etc.
- (f) Gums, etc.
- (g) Dragées.
- (h) Miscellaneous Recipes.

#### 4. RECIPES FOR PRELIMINARY PREPARATION OF INGREDIENTS.

- (a) Marzipan, Nut-pastes, etc.
- (b) Flavours, Colours, Varnishes.
- (c) Glacé Royale, Fondant for covering Bon-bons, etc.



FRUIT JUICE FILTER



COCOANUT GRATER

# THE MANUFACTURE OF CONFECTIONERY

(a)

## I.

### “ SATIN ” GOODS.

For making “satin” goods it will be obvious that a mere description only of any particular method will not necessarily be bound to give the most perfect results, as long experience in this work is most necessary in order to produce the ideal “satin” finish.

A most excellent medium for manufacturing these goods is the Baker-Perkins Automatic Continuous Cooker, and the most essential points to be observed in the operation are to cook the sugar (which must be of first-grade quality) with the smallest quantity of glucose, and to cook up to a maximum of  $320^{\circ}$  Fahr. Great care must be taken to obviate graining when working the sugar after cooking, and not to pull too soft. When taken from the hook or Pulling Machine, all air must be well kneaded out, and, when pulling it for the press, the sugar must be just sufficiently soft for the necessary elasticity, otherwise some of the gloss will be lost through the sugar being still too hot. When worked from a warm table, care must be taken that the table is not too hot, but sufficiently warm to prevent the sugar from cracking on the surface. To facilitate working and prevent any adhesion of the sugar to the warm slab, a sheet of good drill or thin leather is usually employed to advantage.

### “ SATIN ” PRALINES.

Take some sugar, boiled in the Vacuum Pan, Vacuum ‘Eureka,’ or Continuous Cooker. Whiten strongly with marine blue, prepared like other colours. Pull the sugar on the Candy-hook, not too much, and then work it over upon the warm table. Spread out into a smooth square sheet about 2 in. thick, and then put in the middle, extending about four-fifths of its length, praliné paste of about one-third its weight. Bring up the edges of the sheet of sugar, and lap and weld them together so as to obtain a large roll. Stand this roll erect, and bring it to a conical shape. Lay out upon a warm board covered with brass webbing. Draw out the smaller end of the cone into a roll about 1 in. thick, and put this in sections into the Cutting Machine, or cut same by hand, taking care, however, frequently to turn over the large roll in order that it may not lose its rounded shape.

## “ SATIN ” GOODS

### HOLLOW “ SATIN ” GOODS.

Hollow goods are made with boiled sugar as for the “satin” pralines, but with some strips of clear sugar outside. In order to make them hollow the dough should be wrapped round a large conical stick of hard wood, kept warm and slightly greased with vaseline. Then draw out quite round but without closing tight, and, when the roll is about the thickness of a finger, cut off in sections of 20 in. to 24 in., and put these sticks into the Ball-making Machine, which turns them out perfectly regular. The sugar should be slightly flavoured and acidulated. This observation should apply to all classes of goods not containing praliné paste, chocolate, or other vanilla product. In the latter case, vanilla should be used, but no acid, in the boiled sugar serving as a covering.

### CANDY-SPINNING.

Spirals spun on a needle are made with hard-boiled sugar, flavoured and “satined” and slightly acidulated. The paste should be drawn out very fine till it is no thicker than a pencil, and perfectly even. An assistant should turn the handle of the spinner with one hand and, with the other, guide the sugar as it winds round the revolving needle. Some skill is required in this work, where great speed is necessary, in order to have fine goods and to avoid breakage. Assortments are made of all the soft colours.

### CUSHION PRALINES.

The sugar for these small goods is made in the same way as above, only slightly acidulated. The paste is drawn out to the same thickness. Musk-lozenge rollers, or others with a pattern of tiny sticks, are put upon the Drop-roller Machine. In front of the rollers place a sheet of tin with a small hole in the centre, right opposite the design on the rollers. The stick of sugar is passed through this hole to the rollers, the latter being closely set. The drawing out of the sugar is carried out continuously. The person who spreads out the rows of little cushions side by side in front of the cooling-fan need only give a light tap in order to break off one strip when sufficiently long. Assortments of these goods are made in all colours, and with all flavours suitable to the colours.

# THE MANUFACTURE OF CONFECTIONERY

## WAFERS, HARD-BOILED SUGAR.

These wafers are made with and without interior filling. As the goods are very flat, and there is considerable breakage when filling them, we recommend them to be made without filling. The sugar should be prepared as for "satin" goods, flavoured and slightly acidulated. Draw out to the thickness of the little finger and press in the Wafer-press. Assortments are made in all colours and flavours.

## BULL'S EYES (HARD-BOILED).

Bull's eyes are made from clear sugar, with stripes of clear or pulled sugar, in all colours and flavours. They are cut in a small hand-machine or by a power-machine, and are made in all sizes.

## ROCKS.

Rocks are only fancy goods turned out by the Ball Machine, with pulled sugar inside and covered with clear sugar, or inversely with small stripes. The sugar is drawn out to the thickness of the little finger, and at the same time rolled with the palm of the hand so as to twist the stripes into a spiral. They are cut warm in a Rock-cutting Machine in all sizes.

## ARTISTIC FANCIES (HARD-BOILED GOODS).

Under this heading are comprised all hard-boiled goods which show in the interior the form of a flower, a design, a name, a fruit, etc. It is impossible to give any detailed instructions for the manufacture of this class of sweets. Everything depends upon the taste and skill of the workman, his perfect knowledge of colours and shades and their grouping, his ability in forming the batch rapidly and then drawing it out in such a way that it does not get deformed. The manipulation is difficult to learn, and only very special workmen succeed.

## TRANSPARENT PEPPERMINT LOZENGES.

Take 25 lb. of sugar, boiled in the Vacuum Pan or Continuous Cooker, well whiten with marine blue, and add 1½ oz. of good Mitcham peppermint essence, and mix the whole upon a warm table. Pass through the rollers with shallow lozenge shapes. This kind of lozenge gives much satisfaction. They are made in all colours and flavours.

## TOFFEES

### HONEY LOZENGES.

Crystallised Sugar, 100 lb.  
White Honey, 7 lb.  
Drop Goods, fragments clarified, 25 lb.  
Orange-Flower Water, 3 lb.

Melt the whole to 34° Baumé, and boil in the Continuous Cooker. Pass through the Drop-roller Machine with small flattened ball moulds. Then moisten the drops with gum, and mix with fine granulated sugar.

(b)

### EVERTON TOFFEE.

White Sugar, 4 lb.	Butter, $\frac{3}{4}$ lb.
Water, $1\frac{1}{2}$ pints.	Oil of Lemon.
Cream of Tartar, $\frac{1}{4}$ oz.	

See that the sugar is dissolved in the water, add the cream of tartar, and bring quickly to the "hard crack" degree, 305 to 310 F., by the thermometer. Remove from the fire, add the butter (which should be melted ready), let it mix in, then return to the fire and let it just boil through. Do not add the butter while the sugar is actually boiling, or the lot will boil over.

### SWISS MILK TOFFEE OR CARAMELS.

Sugar, 2 lb.	Milk, 1 pint.
Boil to "soft ball." Then add :—	
Warm Glucose, 6 oz.	Fresh Butter, 3 oz.

Continue boiling to "hard ball." For flavouring, add 4 oz. melted bitter chocolate, coffee extract, vanilla essence, almond or lemon flavourings to the above batch just before pouring out.

### FINE TOFFEE.

Sugar, 1 lb. 14 oz.	Cream of Tartar, a pinch.
Full Cream Milk, 1 pint.	
Boil to "soft ball" or 240° F. Then add :—	
Warm Glucose, 6 oz.	Fresh Butter, 5 oz.

Mix well, and boil to "hard ball" or 265° F. Cut and wrap in waxed paper.

# THE MANUFACTURE OF CONFECTIONERY

## TOFFEE.

Sugar, 7 lb.	Butter, 1 lb
Glucose, 1½ lb.	Water.

Cook to 300° F. Flour or milk must be mixed with any fat other than butter, when used.

## ENGLISH MOLASSES CHOCOLATE BON-BONS.

Raw Sugar, 3½ lb.	
Crystallised Sugar, 1½ lb.	
First-quality Molasses or Golden Syrup, 4 lb.	
Glucose, 1½ lb.	
Fresh Butter, ½ lb.	
Condensed Milk, 1 lb.	
Vanilline Sugar, ½ lb.	

Proceed as for soft caramels. Boil to "hard ball"; pour out on marble, and let cool a little. Then pull the paste on a hook, and pass through rollers with large almond-designs. Cover these interiors with ordinary chocolate coating. After some days the interiors of these bon-bons become soft. They keep for a very long time.

## MOLASSES CANDY.

Molasses Syrup, ½ gallon.	Butter, 1 lb.
Full-cream Milk, ½ gallon.	Salt, ½ lb.
Sugar, 6 lb.	Lemon Oil, ½ oz.
Glucose, 4 lb.	Soda, ½ drm.

Mix molasses, sugar and glucose in pan, melt, add milk. Cook to "crack." Add butter, cook to "crack," then add soda and, when cool, put on Pulling Machine.

## CREAMY TOFFEE.

Sweetened Condensed Milk, 3 lb.	Glucose, 4 lb.
Full-cream Milk, 1 quart.	Butter, ¾ lb.
Sugar, 3½ lb.	Vanilla and Salt to flavour.

Cook to "crack." Add butter and vanilla essence. Cut in large squares.

## BUTTER-SCOTCH

### BUTTER-SCOTCH (HARD-BOILED).

Crystallised Sugar, 100 lb.

Golden Syrup (made from Scrap of Drop-goods, clarified), 15 lb.

Fresh Butter, 6 lb.

Salt, 2 oz.

Muriatic Acid, 4 oz.

Melt the sugar and the glucose to 34° Baumé, and then add the salt dissolved in a little water and the muriatic acid, as well as the golden syrup. Boil in the "Eureka" machine. Afterwards add the melted butter, very hot, to the boiled sugar, gradually, until the 6 lb. have been absorbed. Pass, while still quite hot, through the Drop-roller Machine with large lozenge designs, or use the butter-scotch frames, which give a straighter edge. These goods are excellent to the palate. They should be a deep yellow colour.

### BUTTER-SCOTCH.

Demerara Sugar, 2 lb.      Syrup, 1 lb.

Glucose, 2½ lb.      Salt Butter, ¾ lb.

Milk, 1 pint.      Lemon Essence to flavour.

Cook to "crack."

### ALMOND HARDBAKE.

Light Brown Sugar, 5 lb.      Water, 1½ pints.

Glucose, 1 lb.      Oil of Almonds.

Blanched Sweet Almonds, 1½ lb.

Boil the sugar, glucose and water to 305° F., then pour on to the slab over which you have previously placed the almonds as close as possible, laying them cut-side downwards. Before getting quite cold, mark the batch into suitable lengths, so that they will break up easily. Store in airtight receptacles.

### OLD-FASHIONED ALMOND HARDBAKE

Foot Sugar, 3 lb. 8 oz.      Cream of Tartar, ¼ oz.

White Sugar, 3 lb. 8 oz.      Water, 1 quart.

Split and blanched Sweet Almonds, from 4 oz. to 1½ lb.

Melt the sugar and boil sharply; then add the cream of tartar, and boil to "strong crack" or 295° F. Pour gently the hot syrup

## THE MANUFACTURE OF CONFECTIONERY

on to the split almonds carefully distributed over an oiled slab or cooling table, taking care not to disturb them. By means of metal bars, the syrup can be kept of even thickness, and, before setting hard, the hardbake is marked off into bars or strips with circular marking knives or palette knife.

### NUT-TABLETS.

Lump Sugar, 2 lb.	Chopped Nuts, $\frac{1}{2}$ lb.
Water, $\frac{1}{2}$ pint.	Lemon Essence.
Glucose, 4 oz.	

Boil the sugar, glucose and water over a brisk fire to  $310^{\circ}$  F. Add the nuts, stir quickly, and pour out into tins or between iron bars on your slab which has been previously oiled. When nearly cold, mark off as usual for breaking up.

These tablets will require to be kept airtight or they will go very sticky.

### WALNUT TOFFEE.

Lump Sugar, 6 lb.	Water, $1\frac{1}{2}$ pints.
Glucose, $\frac{1}{2}$ lb.	Shelled Walnuts, 1 lb.
Butter, $\frac{3}{4}$ lb.	Salt, a pinch.

Boil the sugar, water and glucose to  $300^{\circ}$  F. ; remove, and add the butter as for butter-scotch, and then re-boil until the butter is well boiled through. Have some shallow, oblong tins well oiled, and pour the toffee out until the tops are level or nearly so. Now place the halves of walnuts in irregular lines on the toffee, pressing them well into it. Mark when nearly cold with a knife into divisions

(c)

### PRALINÉ No. 1.

Gros Flots Almonds, 10 lb.	Mexican Vanilla, 3 oz.
Loaf-Sugar, 10 lb.	

Sort the almonds and see that they are quite clean. Put the 10 lb. of sugar on the fire with the vanilla, the beans being cut lengthways in two. Dilute the sugar sufficiently. When the sugar is partly boiled—that is to say, when it is at “soft ball” point—put in the almonds and boil whilst stirring up the bottom with a spatula, till the sugar is completely boiled and rises. At this moment, with-

## PRALINÉS

draw the pan from the fire, grain the sugar, and scrape the sides of the basin ; then replace upon the fire which should now be covered with ashes. Stir constantly, turning the basin around in different positions from time to time till the sugar is melted and is of a light brown colour, but not burnt. Empty the pan upon a raised-edge iron, cooling-tray, and allow the batch to cool. When the batch is cold, put it into a Melangeur, cold, and grind—an operation which should be continued and completed in a Reducing Machine, likewise cold. The paste must be fine and impalpable. Take this ground praliné and heat in the drying cupboard, and then add to it from 5 to 10 per cent. of superfine unsweetened chocolate. Put the praliné into small tin trays with raised edges (like the pans for jujube paste) and lined with wax-paper ; then let it cool, and cut with a cutter or knife, as desired. This praliné should be dipped in superfine coating. In certain factories 10 per cent. of the coarse praliné is mixed with the paste.

### PRALINÉ No. 2.

This praliné differs from the preceding one only in the quality of the almonds and the amount of perfume. Majorca almonds are used with crystallised sugar and 1½ oz. of vanilline sugar, the proportions and method being the same as for praliné No. 1.

### PRALINÉ No. 3.

Almonds (ordinary), 10 lb.	Raw Sugar (dry), 12 lb.
Turkish Nuts, 1 lb.	

Roast the almonds and nuts upon the open fire in the same manner as for cocoa beans. Put the sugar and the roasted almonds and nuts into a Melangeur, cold, and finish as in the preceding recipe.

### ROASTED GRAINS OR BROKEN PIECES FOR PRALINÉ.

Take 10 lb. of flots almonds, blanched and chopped to the size of a lentil, without powder. Dust these grains or broken pieces with 10 lb. of loaf-sugar grated with vanilla. After dusting, rub slightly with a clean cloth, removing as much as possible of the sugar from the grains or broken pieces. Cover the fire with ashes, and roast the grains, stirring with a spatula. It should become a straw-yellow

## THE MANUFACTURE OF CONFECTIONERY

colour, but without charring. The operation should last half an hour at the least.

### FINE PRALINÉ CENTRE FOR COVERING WITH CHOCOLATE.

Almonds, 22 lb.	}	Made into smooth praliné.
Hazel Nuts, 22 lb.		
Sugar, 37 lb.		

Add :—

Unsweetened Chocolate, 22 lb.	Cocoa Butter, $5\frac{1}{2}$ lb.
Lawn Sugar, 7 lb.	Confectioners' Glucose, 5 lb
Vanilline Sugar, 1 lb.	

Mix well and refine on Granite Rollers.

### FINE CHOCOLATE WALNUT PRALINÉS.

Granulated Sugar, 3 cups.	Sweet Chocolate, 2 oz.
Cream, 1 cup.	Walnut Kernels, 3 cups.
Sugar (cooked to caramel), 1 cup.	

Stir the sugar and cream over the fire until the sugar is melted, then let boil to the "soft ball" degree, or to  $236^{\circ}$  F. Add the chocolate, melted or shaved fine, and beat it in; then pour the mixture on to the cup of sugar, cooked to caramel; add the nuts, and beat until the mass begins to thicken. When cold enough to hold its shape, drop on to an oil-cloth or marble a teaspoonful in a place, and at once set a half nut-kernel on each. Two persons are needed to make these pralinés, one to drop the mixture, the other to decorate with the halves of the nuts. The mixture becomes smooth and firm almost instantly. Maple or brown sugar may be used in place of all or a part of the quantity of granulated sugar designated.

### FINE RUM CENTRE FOR COVERING WITH CHOCOLATE.

Covering-Chocolate, 25 lb.	Rum, 2 gallons.
Smooth Praliné, 30 lb.	Syrup, 40 lb.

Mix well and refine to a smooth paste on Granite Refiner.

## STOCK FONDANT

### HARD NOUGAT.

Hard nougat is made in two ways. The first consists in melting the sugar over a fire without water, stirring with a spatula, and putting into it the almonds, chopped and warm, when the sugar is well melted. This nougat, the proportions of which are varied, is generally made in equal proportions of chopped or sliced almonds and sugar. This is the best method. The second method is quicker, and the proportions are as follows: one-third sugar, one-third glucose, and one-third chopped almonds. Boil the sugar and the glucose to a "hard crack" in a pan over the open fire, and mix in the almonds, chopped and warm, little by little with the spatula. When all is in, cover the fire in the centre slightly with ashes, put back the pan upon the fire, and heat, while stirring, in order to roast the almonds slightly. Empty the whole upon a marble slab slightly greased with vaseline, and then pass through the cylinders in small lots. When the bon-bons are cold, sift them and dust with icing sugar, put them in tins, closing tightly. In this condition they may be kept for a very long time in a cool, dry place, until required for coating with chocolate. These kinds of interiors are made in all sorts of shapes and of all sizes.

(d)

### STOCK FONDANT.

Crystal Sugar, 16 lb.

Water, 2 quarts.

Glucose, 2 lb.

Boil to 240° F. and clear of scum. Sprinkle slab with cold water and pour the cooked syrup on to slab surrounded by iron-bar frame. Pour from one end, not from side to side, and, when all the syrup is in the frame, sprinkle top with cold water and leave till nearly, but not quite, cold. At the proper stage of cooling which can only be determined by experience, work the syrup vigorously with a wooden spatula and do not be afraid of a few minutes' hard work. Cream well from one side to the other, working air into it as much as possible till it can be scraped together into a solid lump. Stock fondant is prepared thus, and put away in clean jars covered with damp cloth.

For machine-made fondant see pages 34-41, dealing with Fondant-making Machines.

# THE MANUFACTURE OF CONFECTIONERY

## GOOD FONDANT FOR MIXING WITH FRUIT, ETC.

Crystal Sugar, 14 lb.

Glucose, 2 lb.

Water, 3 pints.

Boil together the sugar and water, keeping the sides of the pan well washed down. Skim and, after boiling for about ten minutes, add the glucose.

For dipping and icing purposes boil to  $238^{\circ}$  F.

For casting into starch or for fondant-creams boil to  $242^{\circ}$  F.

For hand-moulded or shaped fondants boil to  $245^{\circ}$  or  $246^{\circ}$  F.

Proceed otherwise as for Stock Fondant.

In preparing fondant-cream to which fruit-juices are added, the syrup may be cooked to  $250^{\circ}$  F., allowing the fruit-juices to bring the consistency down to that required for casting, etc.

## ORDINARY PARIS FONDANTS.

Boil 100 lb. of crystallised sugar to  $49^{\circ}$  Baumé, or "very small ball," in the steam-pan with vertical scraper. Then add 35 lb. of cold fondant made with 25 per cent. of glucose, and put the stirring gear into motion. Mix the whole without steam-pressure; add the colouring matter and the flavour, and cast with the Depositing Machine, and proceed as with other fondants. Then crystallise. This kind of fondant is quickly made, and the paste is very fine, but the goods do not keep so long as those made in the Fondant Machine.

(e)

## FRUIT-PASTE BON-BONS CAST IN STARCH.

An excellent method for all fruit-pastes which are to be cast in starch:—

Fruit-pulp, 100 lb.

Crystallised Sugar, 100 lb.

Reduce to one-half the fruit-pulp, in a Steam-pan, stirring all the while. During this time, boil to "hard crack" the 100 lb. of sugar in another Steam-pan; then mix, stirring with the spatula, flavour and colour, and cast by means of the Depositing Machine. All kinds of fruit-paste bon-bons can be made in this way, such as fruit-pastilles, fruit and vegetables, cleopatras, trocaderos, etc. It is possible to have a large variety. If well prepared, they keep for a long time. Some can be glazed, such as the trocaderos, others crystallised in

## JELLIES

sugar, etc. The variety is only in the shapes and colour ; these are endless. The colouring and piping decoration combined make excellent imitations of fruits

### JAMS AND JELLIES FOR CASTING IN STARCH.

Raspberry-pulp, apricot-pulp, or apple-pulp, 3 lb.  
Sugar, 3 lb.

Cook to 230° F.

### CHOCOLATE BON-BONS WITH FRUIT PASTE CENTRES.

Apricot-pulp, 25 lb. Sugar, 25 lb.

Evaporate the apricot-pulp by boiling in a Steam-pan, and reduce in this way to half its weight. Meanwhile, boil the sugar to "crack" in another pan and then mix. Cast in starch or powdered sugar to any design, by means of the Depositing Machine. These interiors must remain in the starch overnight in the drying-room. They cannot be passed to the Air-brush Cleaning Machine as it would crush them to pulp. Cover with good couverture.

### WHITE BRANDY JELLY INTERIORS.

Sugar, 10 lb. Brandy, 1 lb.  
Apple-juice, 1 lb. Japanese Jelly,  $\frac{1}{4}$  lb.

Boil the sugar to the "crack" and add to it the apple-juice, brandy, and Japanese jelly in solution. This mixture should be at 40° Baumé. Cast in starch in moulds of rectangular shape, and dust over with starch. Put the trays in the drying-room for twelve hours.

### ACID JELLIES (FROM JAPANESE JELLY).

Japanese Jelly,  $\frac{1}{2}$  lb. Water, 1 gallon.

Soak jelly overnight in the water. Then dissolve at slow heat and strain through a fine sieve.

Sugar,  $12\frac{1}{2}$  lb. Flavour, Lemon Oil to taste.  
Confectioner's Glucose,  $7\frac{1}{2}$  lb. Colour, yellow to tint.  
Tartaric Acid, large pinch.

To the dissolved jelly, add the sugar. Stir and cook to a good "thread." Add the glucose, and just bring the whole to the boil :

## THE MANUFACTURE OF CONFECTIONERY

then remove from the fire. Dissolve the tartaric acid in a little water, and add the acid, colour and flavour to the slightly cooled syrup. Remove the scum, if there is any, from the boiling, and run into starch to any shape desired. After removal from starch they can be coated with chocolate or fondant-icing, or else steamed and covered with granulated sugar, or crystallised.

### STRAWBERRY (AND OTHER FRUIT) JELLIES.

Crystal Sugar, 14 lb.	Gelatine (dry), 2 lb.
Glucose, 6 lb.	Water, 3 pints.
Strawberry (or other) Fruit-pulp	
Strawberry (or other) Essence	
Colouring	To flavour and colour.

Soak the gelatine for 2 hours in sufficient water to cover it. Dissolve the sugar in 3 pints of water, and bring to the boil. Add to the sugar the glucose, remove scum and continue to boil to 240° F. Add the fruit-pulp and sufficient essence to give good flavour, and the necessary colour according to the fruit-pulp used. Cast into warm starch, and allow to set in a moderately warm room. Clean and dust off the starch from the goods when set, and crystallise in sugar-syrup boiled to 225° F. as directed under "Crystallising." These goods can be sugared if desired by slightly steaming the cleaned goods from the starch-boards and rolling in bright, crystal sugar.

### ORANGE MARMALADE.

Seville Oranges, 9.	Sugar (finest), 9 lb.
Water, 12 pints.	

Cut the oranges, flesh, rind and all very thin, and allow to soak in the water for 12 hours. Boil until quite soft (about 1 hour 20 minutes). Add the sugar, boil and, when boiling, continue for 20 minutes. This will make about 12 lb. of marmalade.

### PRESERVED FRUITS.

In preserving fruits, they must undergo three operations: first, bleaching; second, sugaring; third, preserving.

Choose sound fruit, of good size, and without defects. It should be gathered a little before maturity, so as to be firm and to stand better the different processes of preserving.

## PRESERVED FRUITS

### BLEACHING.

Peeled fruit. Peel and prick the fruit, and put it in cold water with alum (1 lb. of powdered alum to 100 lb. of water).

Boil the fruits by steam, in a large double-bottomed pan. Put the fruits into the pan, and cover them well with cold water. Heat slowly to boiling-point. Shut off the steam, and leave them for a short while in this condition. Then apply a little more steam. Test by pressing between the fingers, and take out those which are soft and put them into cold water, with alum, like the first. Turn on a little more steam in order to hasten the boiling of the harder ones. This operation requires much care, as fruit bleached too much loses all shape, and those insufficiently bleached shrink, and both are good only for low-grade preserves.

### SUGARING.

When the fruits are quite cold they should be drained and then put into syrup at 20 or 25° Baumé, according to their firmness and their quality, it being a general rule that the softer the fruit the higher the degree of density of the syrup, and *vice versa*.

The drained fruits must be put into broad, flat, enamelled basins, not too many in each, so as to prevent those below from being crushed. Pour the syrup, boiling, on to the fruit in the basins, just enough to cover it, and place a sheet of paper over the syrup in each basin, and let them cool in this way. When they are cold see if the syrup has been absorbed right through, and, if so, proceed to preserve them by raising them 2°. If the fruits are not well saturated, bring the syrup up to a simmer, but not to a boil, and leave the fruits in the basins till next day. On beginning the preserving process, take care that the fruits do not ferment, especially in warm or stormy weather. Repeat the preserving or the simmering process once a day, especially at the beginning, or the fruits will ferment, and continue till 36° Baumé is reached. Before finishing, let them stand for some days without touching. When finishing, add 15 per cent. glucose to the syrup. The syrup should be passed through a sieve before covering the fruit with the syrup. The fruit should first be set out in the basin, the deformed or irregular fruits being removed. Let the whole now cool before covering the basins with paper. Wash the basins outside, cover with paper, tie and label, and set in a cool and dry fruit room. Well-preserved fruits will, with care, keep in good condition for

## THE MANUFACTURE OF CONFECTIONERY

several years. This method may be employed with fruits in general. It is the one recognised as the most simple and rapid. Of course, there are various precautions to be taken according to the quality, colour and size of the fruit to be preserved. For example, pineapples, lemons, oranges, angelica, etc., take much longer in bleaching than nuts, pears, plums, etc.

### SULPHURING OF FRUIT.

Although not disposed to favour the sulphuring of fruit, we have to recognise that in the case of very acid fruits it is necessary : their appearance will be improved, and their selling value increased.

### PROCESS OF SULPHURING.

Erect a small shed in some isolated place with shelves to carry wicker baskets. The shed must close well, having, however, an opening at the bottom into which the vessel with the sulphur is to be placed. Fill up the baskets with fruit, placed in rows, and put the baskets into the shed, and close the latter hermetically. Set fire to the sulphur, and leave it burning for a couple of hours. Then open the doors carefully, by means of a pole, or other convenient means of doing so at a distance. Do not approach too near, so as to avoid stifling. Then leave the fruit standing before boiling with water as above.

### FRUITS PRESERVED IN GLUCOSE.

With a view to economy in cost, some manufacturers use glucose in the preserving of the greater part of the fruit. The sugaring is done as described above. For the second operation, the syrup is drained from the fruit and substituted with glucose syrup at the same degree of density, and the work continued as described above, only instead of finishing at 36° the fruit is finished at 38° to avoid fermentation. It is unnecessary to state that fruit preserved in this way is not of the same value as that preserved in pure sugar.

### GLAZING OF PRESERVED FRUIT.

Drain the fruit, then wash in warm water to remove the syrup that there might be upon it. Do not allow it to remain in this water, which would soon dissolve the sugar. Drain. Boil some syrup to 40° Baumé, put the fruit into the syrup, and heat to boiling. With-

## PRESERVED FRUITS

draw the pan from the fire. Beat the syrup with a small spatula, rubbing it against the side of the pan. When the syrup is slightly opaque, spread it out by means of the spatula over a space of about 4 in., and, by means of a five-pronged fork, the prongs of which are slightly curved, dip the fruit into this turned syrup. Immediately remove the dipped fruit and place upon wire grids, resting upon crystallising pans. The glazing may be used indefinitely by renewing it from time to time with new syrup.

### CANDIED OR CRYSTALLISED PRESERVED FRUITS.

Drain and wash the preserved fruits as for glazing, then dry well upon grids in the drying-room, heated to 104° F. (40° C.). When they are quite dry, arrange in rows upon grids at the bottom of large crystallising trays, and return these trays to the drying-room till the time for candying or crystallising.

Boil some syrup to 35° Baumé, pass through a sieve, and let it stand two hours to cool a little. Then pour it over the fruit in the crystallising trays, and place a wire grid upon each tray, with a weight to prevent the fruits from floating. Leave the syrup in this condition for about twelve hours. The work-room should be heated to 86° F. (30° C.). When the coating is formed of fine large and closely set crystals, drain by slightly inclining the trays over a trough. Some hours afterwards incline still more, so that the syrup may drain completely away. Leave the fruits in this condition for twelve hours before turning them over. They must be perfectly dry before packing. Shake them as little as possible in order that the crystals may preserve all their brilliancy.

### PRESERVED FRUITS DRAINED.

Heat the preserved fruits, with their syrup, to boiling-point. Drain off on wire-grids or strainers with large holes. When the fruits are cold, put them in rows upon the grid, and let them stand for an hour in a drying-room heated to 140° F. (60° C.). Take them out, let them cool, and pack in boxes or tins for shipment.

### PRESERVED CHESTNUTS (MARRONS GLACÉS).

Take fine chestnuts—Turin ones are best; then come those of Bologna, Lyons and Ardèche. The fruits should run from 25 to 28 to the pound. Remove the outer husk without cutting the kernel, then boil the same day, and put in syrup of 18 or 20° Baumé.

# THE MANUFACTURE OF CONFECTIONERY

## PLANT FOR PRESERVING CHESTNUTS FOR OUTPUT OF 4 CWT. PER DAY.

Erect three cylindrical copper vessels upon the same floor for treating the chestnuts, two vessels for boiling, and one for the boiling water for renewal. The two boiling-vessels are supplied with nine sieves each, with raised edges. This edge serves to support the sieve above. These sieves, to the number of 36, contain the chestnuts during the boiling-process.

One double-jacketted pan for melting the sugar.

Two steam-heated iron tables, with one dozen openings to hold the basins of chestnuts. These tables should be two inches deep to hold water, the boiling of which assists in preserving the chestnuts in the basins.

Two large wooden buckets to hold the grids of boiling chestnuts.

### BOILING THE CHESTNUTS.

Put the chestnuts, without their husk, into a vessel, and cover with cold water. Into this water put 8 oz. of flour, well diluted with water, and  $1\frac{1}{2}$  oz. of bicarbonate of soda. Turn on the steam slowly, so as to bring the water to boiling-point. Leave it to simmer, without boiling, for an hour ; then change the first water by some more boiling water, into which put  $1\frac{1}{2}$  oz. of dissolved Japanese jelly, but this time without flour or bicarbonate of soda. Again leave simmering until completely boiled, which can be recognised when the chestnuts are all soft. Turn off steam, and hand in a sieve to the women employed in peeling, which must be done with care and delicacy to avoid breakage, and then classify in sizes, large, medium, double and broken.

The chestnuts in sieves, coming from the vessel quite hot, should be put into the buckets containing warm water. The women should be seated around these with basins containing syrup warmed to  $18$  or  $20$ ° Baumé, into which the chestnuts, after peeling, are thrown, putting each size into a separate basin as soon as peeled.

As soon as finished, the basins of chestnuts should be placed into the openings in the steam-table, and the steam turned on below. The basins should remain one hour and a half in this "Bain-marie," into which they should be placed twice per day for three consecutive days.

After each heating, a little new syrup should be added at the same degree of density as that used for the chestnuts. At the second heating add 1 oz. of vanilline sugar to each basin. Each basin should

## MARRONS GLACÉS

not hold more than 6 lb. of chestnuts and 6 lb. of syrup. At the final heating, add 15 per cent. of glucose to the syrup to prevent crystallising. This syrup should stand at 33° Baumé. Preserved chestnuts should not be sold within eight days of their manufacture. They are then all well saturated with syrup and are as tender as they can ever become. Sixteen fairly expert women can take off the outer and inner skins from 4 cwt. of chestnuts per day. Three men can keep the women supplied and, at the same time, preserve the chestnuts as above.

### CALCULATION OF RETURNS.

Medium chestnuts	..	..	..	25	per cent.
Refuse	„	..	..	10	„
Perfect	„	..	..	50	„
Double	„	..	..	15	„

Thirty-three per cent. of the chestnuts are usually found to be broken.

### GLAZING OF CHESTNUTS.

The glazing of chestnuts is done in the same way as the glazing of fruit. One man, assisted by two women to place the chestnuts on the sieve, can glaze two basins per hour.

### CHESTNUT-SYRUP GRAINING FOR USE WITH CHOCOLATE.

Chestnut-syrup which is already flavoured, when grained, is very suitable for chocolate doughs or chocolate coverings.

Heat the chestnut-syrup and then pass through a sieve, afterwards boil in steam tilt pan, stirring all the while. When it is at "ball point" and is beginning to rise, shut off the steam and continue stirring with a spatula until it has all grained like sand. Then pour out into large boxes and stir from time to time. When it is cold pass to the drying-stove, then grind and use like raw sugar.

### SULPHUR-BLEACHING OF CHESTNUTS.

After having taken off the outer skins of the chestnuts, give them a sulphur-bleaching for two hours. Afterwards they should be put into fresh water, and then again boiled as above. In this way the chestnuts are whiter and less liable to breakage, but, on the other hand, they are not so tender and, consequently, not so good. As

## THE MANUFACTURE OF CONFECTIONERY

with fruits, glucose may be used for preserving, and this is done in some factories, but chestnuts so treated are easily distinguished from the others by their taste. The point to be specially kept in view for the manufacture of the finest and best preserved chestnuts is to have them well-boiled, tender and well-flavoured.

### RASPBERRY JUICE FOR JELLY.

Fresh Cleaned Raspberries, 100 lb.

Red-currants (cleaned), 10 lb.

When the fruits are cleaned, put them into a large Steam-jacketted Boiling-pan with five pints of water ; cover them, and boil for ten minutes, or till they burst. Then put the whole into a large basket with straw at the bottom so that the juice alone may filter through, and the pulp remain. The latter is then passed through the Fruit-press in order to extract all the remaining juice. Heat all the juice together in a Steam-pan ; let it simmer, but not come to the boil. Put the warm juice in dry bottles. Cork and tie with string, and then put them upright into a Steam-chest or Retort, and heat gently to  $230^{\circ}$  F. ( $110^{\circ}$  C.). Shut off the steam, and leave the bottles in this condition for two hours ; afterwards, open the Retort slowly so as to avoid the rush of air which otherwise might burst the bottles. The bottles should be wrapped about in old rags. Let them stand in boiling water for 30 minutes. This operation should be performed on the same day in order to avoid fermentation. In a good, cool cellar these juices keep for several years.

### RASPBERRY JUICE FOR SYRUP.

Fresh Cleaned Raspberries, 100 lb.

Acid Red Cherries (cleaned), 10 lb.

[Pass the fruit, when cleaned, through the Fruit-press, and put the juice into clean earthenware basins, and set these basins aside in a cool place, in order that the juice may undergo a slight fermentation. When the scum which forms on the top of the juice begins to sink, the juice should be poured out, filtered and put into bottles. Then cork, fasten with string, and put into the Retort or open boiling tank, as above described for raspberries. About 1 lb. 3 oz. of fruit is

## FRUIT SYRUPS

required to make 1 lb. of juice, according to the kind of fruit and its condition. In some factories the following method is adopted for syrup juices :—

Crush the fruit in basins, stand them in a cool place for about 48 hours, and, when the juice has strained off from the pulp, press the whole and continue as above. We prefer, however, the first method. In factories where it is possible to make syrup and jelly with fresh fruit sufficient for all the year round, the methods which follow give better results than by the system of preserving the juices.

### CURRENT SYRUP FROM FRESH FRUIT.

Red-currants, 100 lb.	Black Cherries, 5 lb.
Raspberries, 10 lb.	

Put the fruits through the press, and allow the juice to ferment slightly in a cool cellar. When the scum sinks, pour out and filter the juice. Weigh the juice, and pour it into double its weight of crushed, loaf-sugar, to which 5 per cent. of glucose has been added. Boil to 32° Baumé, bottle and cork when the syrup is cold. In this way the syrup is very clear, of a beautiful colour, and exquisite taste. In a good, cool cellar it keeps for more than a year, very clear and without graining.

### RED-CURRENT JELLY FROM FRESH FRUIT.

Same proportions as above.

Bring the fruit to their first boil in a Steam-pan until they burst. Extract the juice by means of a Press, then pass through a very fine sieve. Take 12 oz. of loaf-sugar to every pound of juice, boil to jelly-point in a small Steam-pan in batches of 20 lb. Put into pots and, when the jelly is half cold, remove the scum with a spoon. Before covering, be able to place a round piece of paper, steeped in alcohol, upon each pot of jelly, and close the pots by means of parchment moistened in cold water.

NOTE.—All jellies, syrups, fruit-juices, jams, etc., intended for export, should be brought to boiling point in Steam-retort or “Bain-marie,” in order to avoid fermentation in transit.

# THE MANUFACTURE OF CONFECTIONERY

## “VARENA” RUSSIAN JELLIES.

Russian jellies are made in the same way as those above, with this difference, that their jellies contain entire preserved fruits. They are prepared in the following manner:—

### STRAWBERRIES.

Take fine strawberries (pretty firm), and remove the stalks. Boil sugar to “ball point” in a flat-bottomed pan. When the sugar is boiled, put in the strawberries, and bring them repeatedly to a simmer over the fire, often stirring the pan, in order that the heat may be distributed equally through the mass. Empty them slowly into a basin, and allow them to cool. When they are cold, drain them off, and reboil in the sugar to “ball point.” After this second operation the strawberries are sufficiently preserved to be used for the jelly. The same method is used for preparing cherries, small greengages, raspberries, large black-currants, grapes, and some fruits of the country, such as marochka, kloukva, etc.

### METHODS OF USING SMALL FRUITS ABOVE MENTIONED.

When the jelly is boiled and the fruits drained of their syrup, put 5 per cent. of the fruit into the jelly, heat well over the fire, and then put into pots. The fruits thus prepared do not float on the top, but are distributed throughout the jelly, producing a fine effect.

### ANOTHER GOOD METHOD FOR PRESERVING FRUIT JUICES.

In order to sulphur the bottles or the jars, use a thick piece of wire having a cork fixed at one end, and at the other end a rolled-up piece of tow of suitable size, according to the opening of the vessel to be emptied of air and sulphured. The tow is dipped into powdered sulphur which is fired a moment before the vessel is filled with the warm fruit-juice. When filling the vessel, care must be taken to stop in time, for, if it were necessary to take out some juice, some air would enter, which would cause the juice to ferment in a few days. But, if the operation is well done, the juices will keep very well for a year in a cool place. The vessels should be well stopped and sealed with wax. As will be seen, this method is much more economical than those previously described. As for the preparation of the juice, it is the same. All fruit-juices can be preserved in this way.

## RED-CURRANT JELLY

### COMMERCIAL RED-CURRANT JELLY, No. 1.

Preserved Red-currant Juice, 20 lb.

Preserved Apple-juice, 12 lb.

Loaf-sugar, 24 lb.

Dissolve the whole together in a Steam Boiling-pan, and then boil to jelly-point (*à la nappe*) in small batches in a smaller Steam-pan. Put the finished jelly into small jars holding about 6 lb.

### COMMERCIAL RED-CURRANT JELLY, No. 2.

Preserved Red-currant Juice, 16 lb.

Preserved Apple-juice, 16 lb.

Loaf-sugar, 24 lb.

Boil and put into jars as above.

### COMMERCIAL RED-CURRANT JELLY, No. 3.

Preserved Red-currant Juice, 12 lb.

Preserved Apple-juice, 20 lb.

Loaf-sugar, 24 lb.

Boil and put into jars as above.

### COMMERCIAL RED-CURRANT JELLY, No. 4.

Crystallised Sugar, 25 lb. Japanese Jelly,  $\frac{1}{2}$  lb.

Glucose, 35 lb. Water, 16 lb.

Fermented Red-currant Juice, 20 lb.

Dissolve the Japanese jelly in the water and pass through a sieve on to the sugar and glucose. Then add the fermented red-currant juice, warm. Bring the whole to a simmer, but without boiling ; this should be 31° Baumé. Pass the whole through a sieve, and put into jars as above.

## APPLE-JUICE FOR PRESERVING.

Take fine cooking apples quite ripe and sound. Peel, cut in quarters, remove the core, and put the apples into fresh water. Boil in a Steam-pan, adding 10 per cent. of water ; cover, and boil until soft. Put the pulp through the Pulp-press, strain the juice, and put quite warm into sulphured jars, or pass through scalding tank.

# THE MANUFACTURE OF CONFECTIONERY

## APPLE-PULP FROM DRIED APPLES.

When fresh apples are not available, dried apples may be used for preparing apple-pulp. Steep them the day before in fresh water, and use the day following. This pulp is used for making common apple marmalade, which can be sweetened with broken sugar confectionery of all kinds, with glucose or molasses.

## APRICOT-PULP OR OTHER PRESERVES.

Cut ripe apricots in two, lay aside the stones for breaking up ; put the sections of apricots into a Steam-pan with a little water, bring to simmer, then put the pulp in tin cans, and solder covers on well. Bring these cans of pulp to a boil for 30 minutes in a "Bain-marie" or a Processing Retort at  $230^{\circ}$  F. ( $110^{\circ}$  C.).

All fruits are preserved in the same way.

When fruit-pulps are not intended for sale, we recommend them to be sugared 25 per cent., and even 50 per cent. They will not need to be boiled so long, and they will be quite safe from fermentation.

The tinned apricot-pulp on the market is specially suitable for jelly fruits of all kinds when correctly cooked with sugar and flavoured with the necessary essences. Apricots like apples are rich in pectines and greatly assist in the formation of jelly.

## CHEAP APRICOT MARMALADE.

Apricot-pulp, passed through sieve, 100 lb.

Crystallised Sugar, 75 lb.

Glucose, 75 lb.

Pass the pulp through a Strainer, put in the sugar, and boil the whole in a Steam-pan to  $40^{\circ}$  Baumé. Then add the glucose, after boiling, and set out in jars.

All commercial or cheap marmalades can be made in the same manner, the quantity of glucose varying according to the price.

## HALF-PRESERVED FRUITS IN GLASS BOTTLES OR JARS.

These are nothing but partially preserved fruits. When the fruits (of any kind) have reached the middle of the preserving-processes, sort out the finest, and place them in white glass jars. Prepare a

## FRUIT BON-BONS

syrup of pure sugar at 25° Baumé. When it is cold, pour out upon the fruit until it is well covered. Cork the jars, and put them to boil for 20 minutes. When they are cold, seal with wax, and put aside in a cool place. Colour the syrup, if required, according to the class of fruit.

### APRICOT JAM.

Apricot-pulp, 100 lb.  
Crushed Loaf-Sugar, 75 lb.

Pass the pulp through the Pulping Machine, put the crushed sugar and the pulp into a large Steam-pan with mechanical scrapers. Boil to jelly-point between 41° to 43° Baumé, and, while warm, put into pots.

All fine jams are made in the same proportion, and by the same method. For common jams some manufacturers use carrots, melons, and pumpkins, sweetened with glucose.

### “PASTIELAS,” OR RUSSIAN FRUIT BON-BONS.

In Russia, large quantities of fruit-paste bon-bons are made, principally of apples, and are known under the term of “pastielas.” Hitherto these bon-bons have been made by hand. To-day several important houses manufacture them by machine in the following way:—The apples are peeled by a machine, then cut into quarters and seeds removed. They are stewed in large Covered Steam-pans and, while still hot, are put through the Pulping Machine. On coming from the Pulping Machine, the pulp is weighed and put into the Steam Mixing-pan. In this Mixing-pan the paste should be reduced by evaporation to one-half its weight, and then sweetened with an equal weight of sugar, either dry, granulated or fine crystallised, or sugar boiled to “ball point.” In this condition the paste is further mixed for about 20 minutes, and then deposited in thick layers upon paper by means of the Depositing Machine.

### DEPOSITING THE PASTE IN LAYERS.

Some sheets of tin covered with paper, about 36 ins. long by 12 ins. wide, are placed on a table known as the casting-table. The paste, when poured out upon it and spread by means of a wooden leveller,

## THE MANUFACTURE OF CONFECTIONERY

is kept in shape by means of a movable frame lifted and lowered by a pedal. When the paste is completely spread out, the movable frame is lifted, and the pan with its load of paste is taken to the drying-room. The room should be warmed to  $123^{\circ}$  F. ( $50.5^{\circ}$  C.) by means of a current of warm air, or steam-tubes arranged about the floor. A ventilating shaft removes the air laden with moisture. Shelves or iron supports are arranged in rows to receive the tins. As soon as it is noticed that the sheets of paste are sufficiently dry on one side they are lifted off and placed upon hurdles or open racks, till completely dried, which usually takes about 24 hours. When dried, the sheets of paste are piled up one upon the other and cut when wanted. This cutting is done by means of a Cutting Machine with steel knives which cut alternately at right angles to each other, producing oblong pieces of paste about  $1\frac{1}{2}$  in. long by  $\frac{3}{4}$  in. wide, or by means of Special Jujube Cutting Machine which produces diamond-shaped lozenges.

### DEPOSITING BY MEANS OF PNEUMATIC DEPOSITING MACHINE.

The work of depositing small and large doubled "pastielas" is done with great speed and uniformity by means of the Pneumatic Depositing Machine. The "pastielas" are deposited upon sheets of paper, then dried in the drying-room, and afterwards placed upon moistened boards, by which means the "pastielas" can be separated from the paper and doubled. They are then either powdered, steamed, or crystallised in a bath. Quince, cherry, pineapple, red-currant, mirabelle, greengage, apricot and other pastes are made in the same way.

(a)

2.

### RUM LIQUEUR BON-BONS.

Rum, 3 lb.

Loaf-sugar, 6 lb.

Drained Crystal Sugar,  $3\frac{1}{2}$  lb.

Melted Gum,  $14\frac{1}{4}$  oz.

Mix the rum cold, the drained syrup of crystals and the melted gum. Boil the loaf-sugar to a "hard ball," and then mix with the liqueur above mentioned, away from the fire and sufficiently removed from any flame lest the alcoholic vapour from the hot mixing should catch fire. Mix well by pouring back and forth from one vessel to the other. When the mixture is complete it should have a density of  $35^{\circ}$  Baumé for the small bon-bons and  $37^{\circ}$  for the large. In no case should it exceed this figure. Place moist cloths over the vessels containing the hot mixing, and let cool before moulding in starch.

## LIQUEUR BON-BONS

Casting in starch can be accomplished on the Depositing Machines described, using a set of small plungers and the high speed. The liqueur mixing can, of course, be dropped out by hand from a small drop-pan with eight or ten spouts. Starch is sprinkled over the bon-bons which should then be left for twelve hours in the drying-room. The large goods should be turned over after twelve hours in the drying-room by means of a large wire so arranged as to handle a whole row of bon-bons at once

### GENERAL DIRECTIONS FOR LIQUEUR BON-BONS.

1. For superfine liqueur bon-bons, take three parts of sugar and one part of spirit, brandy, rum, cognac, gin, whisky, etc., or jelly fruit-juices, apples, red-currants, quinces, etc. These juices should always be mixed with 10 per cent. of dissolved white gum.
2. Juices that do not form jellies, such as strawberry, black-currant, cherry, essence of coffee, etc., should be used in less proportion. Do not use gum with these juices.
3. Take care to keep the sides of the boiling-pan well sponged in order to avoid graining.
4. Liqueur bon-bons will crack if exposed to too great variations of temperature on coming from the drying-room.
5. Low-priced liqueur bon-bons are best made with a very little apple-juice with 10 per cent. of added essence, and the sugar should be boiled to the "very small ball."
6. Never add glucose or acid to the sugar in making the best liqueur bon-bons.

## CHOCOLATE LIQUEURS.

Crystal Sugar, 8 lb.

Acetic Acid, 4 drops

Water, 3 pints.

Colour.

Liqueur, 2 tablespoonsful (or to taste).

Dissolve the sugar in cold water. When all dissolved, bring the syrup to the boil, washing well the sides of the pan during boiling. Cook to 230° F. When at this temperature, turn off heat and add the acid and colour and, very gently, when slightly cooler, the liqueur. Bring again to 230° F. Be careful not to stir violently, but mix in the acid, colour and liqueur lightly with a thin wire; otherwise there is a tendency to grain. Warm the funnels or Depositing Machine

# THE MANUFACTURE OF CONFECTIONERY

and drop quickly into starch-moulds. Lightly dust over with starch from a sieve, and place in a fairly warm room for 24 hours. Handle the set goods carefully after leaving the starch, as they are very fragile. Cover with good couverture.

(b)

## MEDIUM CONSERVES.

Conсерves are made in plaster moulds representing all varieties of subjects. Steep the moulds for two hours in warm water ; let them drip for some minutes before filling. Arrange them in a row, close together, so as to prevent the syrup from running over when filling them.

### PREPARATION OF THE SUGAR, AND CASTING.

Make a strong solution of fine sugar in the Steam-pan, bring the syrup to 34° Baumé, and use in this way for the batches in hand-pans. Each workman should have charge of two pans. While using one for casting, the other should be boiling. Put in the exact quantity required for one batch which, of course, depends on the number of moulds to be filled. Put some drops of acetic acid into the syrup ; cover the pan with a tin or copper cover pierced with a small hole in the centre. Boil over sharp fire and bring to "hard ball." Withdraw the pan from the fire, dip the bottom into cold water, sponge well the sides of the pan, and stir with a round picce of wood, rubbing slightly the bottom of the pan.

As soon as the syrup commences to become opaque, mix the whole mass quickly and cast in the moulds as quickly as possible. In making the hollow fondants, an assistant should empty them as fast as the outer crust forms upon them. This work requires great care and must be done quickly. The fine appearance and lightness of the goods depend upon it. The conserves, when well made, should be brilliant, light, and of a fine and close grain. One workman and an assistant make about ten gross per day of goods averaging 4 ins. The rest of the work belongs to the decorator. Aided by young girls, he trims, colours, decorates and lays on the outside ornamentation. All conserve work is done in the same manner, in moulds representing eggs, fish, game, fruit, animals, etc.

The conserves, which can be crystallised, preserve their fine appearance for a long time. They should be coloured and painted before crystallising. The piping is done afterwards.

## CANDIED SUGAR GOODS

### BIJOU PASTILLES.

Boil quantities of sugar to  $38^{\circ}$  Baumé, being careful to keep the pan well sponged, and boil over a sharp fire. Colour and flavour strongly with all kinds of colours and flavours. Cast warm, with a ten-spout pan, upon glazed or wax-paper, the sheets of paper being placed upon perfectly smooth sheets of tin. Put these bon-bons in the drying-room, heated to  $104^{\circ}$  F. ( $40^{\circ}$  C.), overnight. The next day, dampen the paper underneath, in order to remove the pastilles. Put these latter back into the drying-room until completely dry. These small pastilles are very good, and give a charming effect in filling the tops of the tins or bon-bon boxes.

These same bon-bons can be made in large quantities by means of the Pneumatic Depositing machine, better known under the name of "Lovers' token" Machine. The sugar is boiled to the same degree,  $38^{\circ}$  Baumé, in batches of 1 cwt., and passed to the Depositing Machine. The bijou pastilles, thus made, are more regular in size than those cast by hand. Naturally it requires more space and material. These pastilles should be no larger than the head of a pin.

### CANDIED OR CRYSTALLISED EGGS.

Boil the syrup to  $37^{\circ}$  Baumé for the small.

„ „ „  $37\frac{1}{2}^{\circ}$  „ „ „ medium.

„ „ „  $38^{\circ}$  „ „ „ large.

Take fine loaf-sugar, and melt with the least possible quantity of water, and blue the syrup for the white confection; take starch-trays suitable for the size of egg to be printed. The starch must be dry and warm. Print with great care by means of a set of very dry plaster moulds, and take care in pouring out with the hand-dropper that the syrup does not touch the sides of the impression or mould: it would destroy the shape. Fill the moulds well with syrup and dust over with starch. Do not shake the trays after they are printed. Do the filling on the spot. When one row of trays is filled, put another row on top of the first, and so on. The room should be kept at  $86^{\circ}$  F. ( $30^{\circ}$  C.) during the twelve hours that the eggs require for setting. Afterwards, remove them from the trays with great care and let them drip, piercing the crust on top and inclining them on the grids arranged for this purpose. Let them drip for six hours and then trim, without waiting

## THE MANUFACTURE OF CONFECTIONERY

for them to be too dry, so as to prevent breaking. Afterwards, let them go to the decorators who will ornament them. All kinds of fancy goods, large and small, are made in this style—large decorated objects, small transparent boxes, closing very well and strong enough to hold about  $\frac{1}{4}$  lb. of small bon-bons.

(c)

### CRYSTALLISATION (1ST METHOD).

Almost all bon-bons require to be crystallised, a process which, though very simple, demands a good deal of care. It should be entrusted only to a careful and competent workman. All the vessels should be kept quite clean. Use only loaf-sugar, which is the richest in crystals. Dissolve the sugar in as small a quantity of water as possible, in order that it may not remain too long upon the fire before reaching the required degree, and principally in order not to destroy its crystals by too long boiling. Before the syrup reaches the boiling-point it must be completely dissolved, without grain. Sponge the sides of the pan frequently, and boil as rapidly as possible. When the syrup has arrived at  $33\frac{1}{2}$  Baumé, turn off the steam, and pass the syrup through a very fine sieve into pans, the capacity of each not exceeding 2 cwt. Put these pans of syrup into a cool place. Do not touch during cooling, and, as far as possible, let them stand near where the crystallising is to be done. When the syrup is cold, but not too cold, lift off the crust formed on top, by means of a large skimmer, without touching the sides of the pan.

By means of a large ladle, pour out the syrup upon the bon-bons in their tins which have been prepared beforehand. When the bon-bons are well covered with syrup, put a wire grid over them, and upon this grid a moistened cloth from which all the water has been squeezed out. Stretch it carefully over the grid so that there are no creases, put the trays in piles one above the other, and do not touch for twelve hours. This method is for fondants, almond-paste, fruit-liqueurs and other bon-bons. When the bon-bons are crystallised, which is easy to verify, they should appear covered with small, fine, close crystals. Pour off the syrup, and allow them to drip into the drainers, with one corner slightly inclined. Keep them in this position for two hours, and then give them a much greater inclination, in order that all of the syrup may run off. Leave in this position

## CRYSTALLISATION

for six hours. Afterwards put them in piles one above the other, and remove the cloths, first moistening them a little with a sponge. When the cloths are removed, leave the bon-bons to dry in the open air in piles, and cover them with sheets of paper to avoid dust. When they are dry, put them into clean sieves, and carry to the packing room. Do not put too many into the sieve, in order to allow the crystals to dry completely. Shake the crystallised bon-bons as little as possible, as friction causes the crystals to whiten, and they lose their fine appearance, and, although quite fresh, they will look old. Before the crystallising process, all the bon-bons should be perfectly clean, without sugar or starch upon them, likewise the tins and the wires. Everything should be cold. All the tins should have a wire at the bottom, with the exception of those with small liqueur bon-bons, which are crystallised in tins without grids at the bottom; but, in their case, two are required on top. The syrup, drained from the crystallising pans, should, as far as possible, be used only once. Besides, it may be employed in the manufacture of drops and for ordinary chocolate creams.

Where considerable quantities of crystallised goods are made, we recommend an apparatus which is manufactured by Messrs. J. Baker Sons and Perkins, Ltd.—viz., a Combined Crystal Syrup Cooking and Cooling Machine. As its name indicates, both the operations of cooking and cooling are done in the same apparatus. Arrangement is made also for drawing off the syrup from the bottom. In this way the syrup undergoes no agitation, and much finer crystals are produced.

NOTE.—The crystallising room should always be kept above 77° F.

### CRYSTALLISATION (2ND METHOD).

Obtain crystallising tins and fine top and bottom wires to fit. Boil at the rate of 10 lb. of crystal sugar to 5 pints of water, without acid or glucose, to 220° F. or 30° on the saccharometer (syrup gauge) for a fine crystal, and up to 225° F. for a large rough crystal.

Allow the pan with cooked syrup to cool without disturbance and covered with paper to prevent access of dirt and dust. A hole should be made in the paper to allow of escape of steam. During boiling, every particle of scum must be removed, and, by sponging the

## THE MANUFACTURE OF CONFECTIONERY

sides of the pan, any tendency to grain prevented. The utmost cleanliness must be observed throughout.

When cold, the syrup can be poured on to the goods in the crystallising-pans very slowly. Cover the filled pans with damp muslin, lift carefully the pans on to shelves free from vibration, and allow to crystallise for 10-12 hours. When the crystals have formed, lift the muslin, and pour off the syrup from one corner. This syrup can under most circumstances be used again on addition of more sound crystal-sugar and when cooked up again to the correct degree.

Do not handle the crystallised goods whilst wet, but do the separation of the pieces, if necessary, with a fork or wires. Let the pieces dry, and observe the precaution as in the previous directions.

### PLAIN SYRUP.

Plain syrup ought in winter to show, when boiling, 29° Baumé, and in summer 30°; when cold, in winter 34°, and in summer 35°.

Pure Sugar, 50 lb.

Water, 26 lb.

It will not be necessary to describe further this process, as every confectioner knows it, and details have already been given.

### COMPOUND SYRUP.

Compound syrups ought in summer to have a density when boiling of 32° Baumé, and in winter 30°; when cold, in summer 37, and in winter 35°.

Two men should be able to make about 75 gallons of compound syrup per day.

### CRYSTALLISED ROSES AND VIOLETS.

Crystallised roses and violets are always very expensive, and it is necessary to make provision in season. In March buy large Parma violets; they are then crystallised two or three times in succession, the sugar of the crystallising syrup being perfumed with ionone, and, in the case of roses, perfumed with essence of rose, and coloured. In both cases this method is very easy and, above all, very economical. The violets and roses thus treated will keep for a

## TABLETS

very long time ; care must be taken to dry them well after each crystallisation. Four days in a very hot drying-room after each operation is not too much. Without this precaution the petals mould. The crystallising syrups are made to a density of 35° Baumé.

### ROCK SUGAR.

This is made in the same way and with the same care as the syrup for crystallising. Instead of to 33½°, boil the sugar to 37° Baumé, and, as soon as boiled and passed through a fine sieve, transport it to a hot or drying-room, heated to 60° or 70° C., and pour into tins holding about  $\frac{1}{2}$  cwt. of syrup. The tins are oblong, pierced with little holes in eight or ten rows, placed zig-zag,  $1\frac{3}{4}$  in. apart. In each of these holes, pass a thread of cotton by means of a long needle to the corresponding opposite hole. The holes are stopped with gummed paper before putting in the syrup, and dried well. Allow these tins, filled in the way indicated, to remain in the hot room five or six days until the crystals are of the size required. Before draining, wash with a little warm water the inside of the tins in order to obtain perfectly clear crystals. Let them dry well before taking them out of the tins.

3.

(a)

### PEPPERMINT TABLETS (FOR COMPRESSING MACHINES).

White Stearine, 8-10 parts.      Alcohol, 40-50 parts.

Mix thoroughly and dissolve.

Gelatine, 3 parts.      Water (hot), 50 parts.

Dissolve these, and add with the alcohol-stearine solution :—

Icing Sugar, 1,000 parts.

Rub the paste through a fine sieve, and dry by exposing to warm air. Sift again and add :—

Peppermint Oil, 2-3 parts.

Keep the mass in well-fitting tins preferably for 24 hours to enable the peppermint to permeate thoroughly.

# THE MANUFACTURE OF CONFECTIONERY

## COUGH LOZENGES (FOR COMPRESSING MACHINE).

Icing Sugar, 25 parts.

### Colour.

Flavour one-tenth part Fennelseed Oil, one-tenth part Aniseed Oil, one-fifth part Extract of Polygonum.

Mix thoroughly with gelatine solution and stearine as in peppermint tablet recipe, and add 5 parts of syrup. Dry well, sift and compress.

## EFFERVESCENT BON-BONS (FOR COMPRESSING MACHINE).

Make in two parts, one part containing the bicarbonate of soda, the other the tartaric acid. Thus :—

Moisten the sugar with alcohol so that balls can be formed with the hand. Add colour and then the soda, till thoroughly mixed. Dry by exposure to air or in a warm place.

(b) Coarse Ground Sugar, 30 parts. Alcohol.  
Tartaric Acid, 20 parts. Flavour.

Moisten the sugar with alcohol as above. Add the acid and flavour. Mix well, and dry as before.

Lightly compress the two mixtures (*a*) and (*b*) separately, using talc powder for dusting, which can be removed subsequently by brushing.

## THIRST QUENCHERS (FOR COMPRESSING MACHINE).

Fine Icing Sugar, 100 parts.

Powdered Tartaric Acid, 12 parts.

Powdered Citric Acid, 5 parts.

Then add gelatine and stearine as described under peppermint tablets. Add colouring, and work well in a Mixing Machine. Rub through a fine sieve, dry and flavour with raspberry, lemon, pineapple flavouring, etc.

## LOZENGES

COCOA, CHOCOLATE, COFFEE, TEA, SOUP-SQUARES,  
ETC. (FOR COMPRESSING MACHINE).

By employing a machine with progressive pressure, any of the above materials can be compressed on a Compressing Machine.

Pure cocoa powder is easy to compress. Chocolate powder can be easily tabletted when a brushing apparatus is attached, and the Compressing Machine is worked in a cool room. Milk chocolate, composed of cocoa powder (dark colour) 5 parts, icing sugar  $7\frac{1}{2}$  parts, milk powder  $2\frac{1}{2}$  parts, warmed and mixed with a very little glycerine to darken, sifted and cooled, is easily treated. Coffee requires to be very finely powdered, and worked on the progressive pressure principle, as also tea can be treated when powdered.

Soup squares composed of peafLOUR, beanflour or lentil flour, 30 parts ; lard or beef suet, 5 parts, mixed when warm with requisite spice and salt, cooled down to  $60^{\circ}$  F., can be readily compressed with progressive pressure.

### ENGLISH CONVERSATION MINT LOZENGES.

Gum Tragacanth, 1 lb.	Mitcham Mint, 1 lb.
White Gum in Powder, 4 lb.	Pure Water, 10 lb.
Fine Pulverised Icing Sugar, 100 lb.	

Dissolve the gum tragacanth in 6 lb. of pure water for a couple of days, and dissolve the white gum in the remaining 4 lb. of water. Pass the two dissolved gums separately through a fine sieve, and then mix in the Mixing Machine together with the mint essence and the fine pulverised icing sugar. Whiten well the paste with a solution of marine blue. Make a perfectly smooth paste with plenty of consistency, and then pass through the Combined Gauging, Stamping and Lozenge-cutting machine. The lozenges, as cut, should be deposited by the machine upon boards. They should then be put into a drying-room at a low temperature. When they are quite dry, they should be passed quickly through a jet of dry steam in order to give them a smooth and shiny surface.

All conversation lozenges are made in the same manner. In order to obtain for them a whiter appearance, an emulsion of white of eggs or albumen may be added. In the manufacture of common grades,

## THE MANUFACTURE OF CONFECTIONERY

gelatine may be used instead of gum tragacanth, and American peppermint instead of Mitcham mint, according to the conditions of cost and sale.

### MINT (DROP) LOZENGES.

Granulated Sugar, 140 lb.	Mint Essence, 13 oz.
Broken Sugar, 60 lb.	Acetic Acid, $\frac{1}{3}$ oz.
Pure Water, 34 lb.	

The mixing may be done cold, but preferably hot, as the lozenges will thus be less brittle. Melt the 60 lb. of broken sugar in the 34 lb. of pure water and dissolve in a Steam Boiling-pan, letting it boil for a couple of minutes. Then turn off the steam, and add the 140 lb. of granulated sugar, the mint essence and acetic acid. If the lozenges are to be white, add a solution of marine blue. Heat this paste to a simmer, stirring the while, but do not allow to come to a boil. Put the whole into the Pneumatic Lozenge Machine, where it should be kept warm with a slight steam-pressure. This machine makes perfect lozenges, and gives an output of about 8 cwt. per day of lozenges in various sizes. In the manufacture of ordinary grades, crushed crystallised sugar and American peppermint may be used. (The granulated sugar mentioned throughout is a somewhat coarse icing sugar.)

### LOVERS' TOKENS, " DEW DROP " LOZENGES, ETC.

Fine Gelatine, 6 $\frac{1}{4}$ oz.	Warm Glucose, 20 lb.
Cold Water, 6 lb.	Powdered Sugar, 190 lb.
Boiling Water, 6 lb.	

Steep the gelatine in the 6 lb. of cold water for twelve hours beforehand. Next day, boil 6 lb. of water, and add the gelatine and the water in which it was steeped, away from the fire, as well as the glucose, warm. With this liquid, make a paste in the large Kneader with the 190 lb. of powdered sugar. The latter should first be passed through a sieve, so that there may be no grains or lumps. Mix the whole till the paste is perfectly smooth and has some body. Put the paste while still warm into the special Pneumatic Depositing Machine ; adjust the play of the pistons according to the size of the lozenge, and keep the air-pressure at ten atmospheres. The large lozenges, of the size of a two-shilling piece, are received upon glazed paper,

## LOZENGES

and then carried to the drying-room upon tins. This room should be heated to  $104^{\circ}$  F. ( $40^{\circ}$  C.). English manufacturers often print a motto on the top of each lozenge by means of a rubber roller fitted with letters, which are coloured with carmine, before the lozenges are taken off. One night in the drying-room is sufficient to dry this kind of lozenge. Moisten slightly the bottom of the sheets of paper, and remove the lozenges by means of a special blade arranged for this purpose. Return the lozenges now to the drying-room, to complete the drying, till the following day. Low-priced lozenges of this class are packed in bulk. When well made, they are very pretty. They are made in all colours and sizes and flavours. Only the larger ones are marked with mottoes.

By the help of the Depositing Machine, three persons can make a ton a day. In addition to the bijou lozenges already mentioned, this machine makes drop-goods of perfect uniformity. For this latter work, it must be fitted with a double bottom to keep the paste warm while depositing: the paste being heavier gives a larger output.

## ACIDULATED AND CRYSTALLISED FRUIT PASTILLES.

Granulated Sugar, 100 lb.	Citric Acid, $2\frac{1}{2}$ lb.
Pure Water, 17 lb.	Orange or Lemon Skins, 30 lb.

Infuse the skins (only the yellow part) in a little warm syrup for two hours. Mix the sugar and water, and heat as in the case of mint drops. Just before casting, add the orange or lemon skin infusion, which has been passed through a sieve, as well as the citric acid. Colour the paste according to the flavouring. Cast with the Pneumatic Lozenge Machine in large pastilles which, after drying, should be crystallised in the ordinary manner. These pastilles are made in all colours and flavours.

## ORGEAT PASTILLES.

Icing Sugar, 35 lb.	Bitter Almonds, 1 lb.
White Gum, 1 lb.	Orange-flower Water, 6 lb.
Sweet Almonds, 2 lb.	Gum Tragacanth, $\frac{1}{3}$ lb.

Blanch the almonds as for orgeat syrup, and grind in the Orgeat Mill with the orange-flower water. Put in press, and use the liquid to dissolve the gum and the gum tragacanth separately, and then continue as for conversation lozenges. The paste should be well

## THE MANUFACTURE OF CONFECTIONERY

whitened with a solution of marine blue. The almond-pulp may be dried in the drying-room and used for hard nougat, mixed with other almonds.

### STAMPED PRALINÉ LOZENGES.

Icing Sugar, 70 lb.	Gum Tragacanth, 10 oz.
Praliné, 8 lb.	Vanilline Sugar, $\frac{1}{2}$ lb.
Pure Water, 12 lb.	White Gum, 2 lb.

Dissolve the praliné paste in the water and use this liquid to dissolve the two gums separately. Add the vanilline sugar when mixing the paste. Colour a deep brown with burnt sugar, and then proceed as above.

### STAMPED COFFEE LOZENGES.

Icing Sugar, 70 lb.	Gum Tragacanth, 10 oz.
First-quality Roasted Coffee, 8 lb.	White Gum, 2 lb.
Pure Water, 12 lb.	Vanilline Sugar, $\frac{1}{2}$ lb.

Grind the coffee in the Orgeat Mill with the 12 lb. pure water. Put into a press, and let the resulting liquid stand for several hours. Draw off, clear, and use this liquid to dissolve the two gums separately. Proceed as above. The colour should be light brown.

### STAMPED CHOCOLATE LOZENGES.

Icing Sugar, 70 lb.	Pure Water, 12 lb.
Cocoa Powder, 8 lb.	Gum Tragacanth, 10 oz.
White Gum, 2 lb.	Vanilline Sugar, 5 lb.

Proceed as above, dissolving the cocoa powder in the 12 lb. of water, warmed. The colour is a brownish yellow. All these stamped lozenges should be dried at a low temperature.

### CACHOU LOZENGES.

Icing Sugar, 70 lb.	Pure Water, 12 lb.
White Gum, 2 lb.	Gum Tragacanth, $9\frac{1}{2}$ oz.

Flavour with cachou essence to taste. Proceed as with conversation lozenges. Colour pale pink. Other flavours, such as lavender, rose, etc., can, of course, be used.

## CARAMELS

(b)

### SUPERFINE SOFT CHOCOLATE CARAMELS.

Fresh Cream, 3 lb.	Loaf-sugar, 3 lb.
Fresh Butter, 1 lb. 2 oz.	Vanilla Syrup, 1 lb.
Unsweetened Chocolate, 2 lb.	Glucose, 12 oz.

Put the sugar, the glucose and cream, along with the vanilla syrup, into a hand-pan which has been thoroughly cleaned. Boil over a not too-sharp fire, stirring continually with a wooden spatula. Keep the sides of the pan well sponged. When the liquid reaches "ball point" put in the chocolate after first melting it, and then add the butter in pieces gradually; when this is done, boil to "hard ball." Pour out upon the marble slab or cooling plate, first greasing same with white vaseline oil, and surround with a frame made of four iron bars. When the dough is three-quarters cold, turn it over, and wipe thoroughly with a clean cloth, and then cut with a knife or circular cutter. These caramels are wrapped in waxed paper and tinfoil. They are very good, but cannot be kept long.

### SUPERFINE SOFT COFFEE CARAMELS.

Loaf-sugar, 1 lb. 8 oz.	Fresh Butter, $6\frac{1}{2}$ oz.
Glucose, 7 oz.	Infusion of Coffee, 5 oz.
Fresh Cream, 1 lb. 8 oz.	

Same directions as for the chocolate caramels above.

### NON-DRYING SOFT CHOCOLATE CARAMELS.

Crystallised Sugar, 15 lb.	Fresh Milk, 40 lb.
Glucose, 10 lb.	Glycerine, $3\frac{1}{4}$ oz.
Unsweetened Chocolate, $2\frac{1}{2}$ lb.	Vanilline Sugar, $4\frac{1}{2}$ oz.
Dissolved Japanese Jelly, $1\frac{1}{2}$ oz.	

Put the sugar, the glucose and the vanilline sugar into a Steam-pan with a vertical stirrer and scraper along with half of the milk. Set the pan in motion with a low pressure of steam, and bring to "soft ball." Then slowly add the rest of the milk. Sponge well the sides of the pan, and do not allow the coagulated parts of the milk to burn, otherwise the nature of the product would be completely changed. When all the milk has been added and the mass brought to "hard ball," then mix in the Japanese jelly and the glycerine together

# THE MANUFACTURE OF CONFECTIONERY

with the chocolate which has previously been melted. Again boil to "hard ball," and pour out on a marble slab, which has been previously greased with odourless vaseline oil, and surround in a frame of iron bars. When the paste is three parts cool, turn it over gradually, wiping the under surface clean. Then pass through fluted rollers, and cut with Caramel Machine. Put the caramels into cardboard boxes, arranged so that each caramel shall be isolated. In this way, without omitting Japanese jelly and glycerine, the recipes may be varied according to the selling price. The glycerine prevents the caramels from drying and spoiling; the Japanese jelly helps to preserve the shape. Caramels with coffee or other flavours are made in the same way.

## CLEAR CARAMELS.

Crushed Sugar, $6\frac{1}{2}$ lb.	Butter, $\frac{1}{2}$ lb.
Cocoa Butter, 2 oz.	Condensed Milk, 1 quart.
Cream of Tartar, a pinch.	Vanilla Essence.

Bring sugar, milk and tartar to the boil, add the other ingredients, and boil up to "crack," keeping it well stirred. Pour out on to an oiled slab and, when cool, mark off.

## COCOANUT CARAMELS.

Sugar, 4 lb.	Cocoanut, $\frac{3}{4}$ lb.
Milk, 1 quart.	Cream of Tartar, a pinch.
Cocoa Butter, 2 oz.	One Tin Condensed Milk.
Glucose, 1 lb.	

Proceed as for clear caramels.

## HONEY CROQUANT.

Sugar, 1 lb.	Chopped Walnuts, $\frac{3}{4}$ lb.
Honey, 1 lb. 3 oz.	

Melt the sugar without water to a nice golden colour. Stir in the honey, and mix well. Heat up again, and stir in the walnuts. Turn out the batch on to a well-oiled slab; press flat, and run a rolling-pin over the top to get a nice level sheet. When cool, cut out with Caramel Cutter. Cover with fine couverture, and decorate with a half-walnut.

## CARAMELS

### CREAM CARAMELS.

Sugar, 6 lb.	Cream (or Condensed Milk), 1 quart.
Fresh Butter, $\frac{1}{2}$ lb.	Zest of 2 Lemons.
Glucose, 1 lb.	

Rub the zest off the lemons, place in a copper Steam-pan with 2 oz. sugar, put upon the gas-stove, and cook until a light brown. Now dissolve the remainder of the sugar in the cream or milk, add the glucose, place upon the stove and boil, keeping well stirred. Turn in the caramel flavour (if used), add the butter, and, as soon as it has boiled through, try a little in cold water (it must break off with a crack to be ready), then pour out on to an oiled slab between irons, and, when cool, mark off into squares the size required. These should be wrapped in greaseproof paper.

### SOFT CHOCOLATE CARAMELS.

Sugar, 15 lb.	Glycerine, 3 oz.
Glucose, 10 lb.	Vanilline Sugar, 3 oz.
Unsweetened Chocolate, 3 lb.	Japanese Jelly, 1 oz.
Fresh Milk, 30 lb.	

Dissolve the Japanese jelly in a "Bain-marie" in 32 times its weight of water. Put the sugar, glucose and milk into a Steam Mixing and Stirring Pan. Boil to "hard ball," and keep the basin well sponged. Now put the Japanese jelly in as well as the glycerine, vanilline sugar and the liquid chocolate. Mix, and boil again to "hard ball." Pour out upon a cooling-plate, greased with white vaseline oil and fitted with an iron frame. After cooling, turn over and wipe the dough. Pass through the Brake, and cut into squares with the Caramel-cutting Machine. These caramels, if made with care, keep in good condition for several months. They must not be boiled too quickly, otherwise they stick to the teeth, and the dough becomes slimy.

### CHOCOLATE CREAMS.

Sugar, 4 lb.	Unsweetened Block Chocolate, $\frac{1}{2}$ lb.
Butter, 1 lb.	Cream of Tartar, a pinch.
Milk, 1 quart.	Vanilla Essence.

Proceed as for clear caramels.

# THE MANUFACTURE OF CONFECTIONERY

## CHOCOLATE CARAMEL.

Sugar, 3 lb.	Unsweetened Chocolate, 12 oz.
Glucose, 3 lb.	Vanilla Sugar, 1 oz.
Condensed Milk, 5 lb.	Fresh Butter, 12 oz.

Proceed as for other caramels.

## RIBBON CARAMELS.

Chocolate layers :—

Granulated Sugar, $1\frac{1}{4}$ cups.
Confectioner's Glucose, $\frac{1}{2}$ cup.
Butter, $\frac{1}{4}$ cup.
Cream of Tartar, $\frac{1}{16}$ teaspoonful.
Milk, $1\frac{1}{4}$ cups.
Sweet Chocolate, $1\frac{1}{4}$ oz.
Vanilla Extract, 1 teaspoonful.

White layer :—

Granulated Sugar, $\frac{2}{3}$ of a cup.
Water, a scant $\frac{1}{4}$ of a cup.
Confectioner's Glucose, 1 cup, less one tablespoonful.
Desiccated Cocoanut, $\frac{1}{2}$ lb.

Put sugar, glucose, butter, cream of tartar and the fourth of a cup of milk over the fire, stir until the mixture boils, then very gradually stir in the rest of the milk. Let cook, stirring occasionally, to  $248^{\circ}$  F., or until a firm ball may be formed when tested in water or on a cold marble. Add the chocolate and vanilla, and mix thoroughly. Turn into two well-buttered shallow pans. For the white layer, put the sugar, water and glucose over the fire, stir until boiling, then add the cocoanut, and stir occasionally until a "soft ball" may be formed, when a little of the mixture is dropped upon a cold marble slab. Put this mixture over the fire to dissolve the sugar, but do not let it begin to boil until the chocolate layers are turned into the pans. When the whole mixture is ready, turn enough of it on to one of the chocolate layers to make a layer about one-third of an inch thick. Have the other chocolate layer cooled by standing in cold water, remove it from the pan, and dispose above the cocoanut layer. Let stand until cold and firm, then cut in cubes; wrap each cube in waxed paper.

## CARAMELS

### CHOCOLATE NUT CARAMELS.

Granulated Sugar, 2 cups.	Sweet Chocolate, 3 or 4 oz.
Confectioner's Glucose, 1½ cups.	Walnut Kernels, 1½ cups.
Cream, 2 cups.	Vanilla Extract, 2 teaspoonsful.
Butter, 1 cup.	

Put the sugar, glucose, one cup of the cream, and the butter over the fire ; stir and cook until the mixture boils vigorously, then gradually add the other cup of cream. Do not allow the mixture to stop boiling while the cream is being added. Cook until the thermometer registers 250° F., stirring gently by moving the thermometer through the mixture every four or five minutes. Without a thermometer boil until a "hard ball," which may be tested by dropping a little in cold water. Remove from the fire, add the chocolate and nuts, and heat until the chocolate is melted ; beat in the vanilla, and turn into a biscuit-pan, nicely oiled or buttered, to make a sheet  $\frac{3}{4}$  of an inch thick. When nearly cold, turn from the pan, and cut into cubes.

### CHOCOLATE CARAMEL WALNUTS.

White of one Egg.
Maple or Caramel Syrup, 3 tablespoonsful.
Water, 1 tablespoonful.
Sifted Confectioner's Sugar.
Vanilla Extract, 1 teaspoonful.
Sweet Chocolate, 2 or more oz.
Whole Shelled Walnuts.

Beat the white of egg slightly, add the syrup, water, sugar as needed, the chocolate melted over hot water, and the vanilla, also more water, if any necessary. Work with a silver-plated knife, and knead until thoroughly mixed, then break off small pieces of uniform size, and roll them into balls in the hollow of the hand, flatten the balls a little, set the half of a walnut upon each, pressing the nut into the paste, thus flattening it still more. The caramel gives the chocolate a particularly nice flavour.

# THE MANUFACTURE OF CONFECTIONERY

## CHOCOLATE CARAMEL (EXTRA FINE).

Cream, 3 pints.	Sugar, 2 lb. 13 oz.
Fresh Butter, 1 lb.	Glucose, 2 lb. 13 oz.
Unsweetened Chocolate, 1 lb.	Vanilla Essence, 2 drms.

Put chocolate on gas with  $\frac{1}{2}$  pint water ; cook to paste. Then add sugar and glucose, boil, and then add cream. Cook to "crack," add butter and vanilla essence.

## LILY CARAMELS.

Sugar, 1 $\frac{1}{2}$ lb.	Flour, 1 $\frac{1}{2}$ lb.
Confectioner's Glucose, 4 lb.	Vanilla Essence } to flavour.
Condensed Milk, 12 lb.	Caramel Essence }
Fat, $\frac{1}{2}$ lb.	Whole Blanched Almonds, 2 lb.

Place sugar and glucose in pan, and add milk. Cook to "crack." Then stir in fat, flour and add almonds.

## WRAPPED CARAMELS.

Condensed Milk, 35 lb.	Cocoanut Fat, 3 lb.
Sugar, 15 lb.	Flour, 5 lb.
Glucose, 30 lb.	Flavour to taste.
Cocoanut, Almonds or Walnuts, 6 lb.	

Melt down the fat with the flour. Cook sugar, glucose and milk to "crack." Then add the nuts and fat with butter, if desired.

## CHEAP WRAPPED CARAMELS.

Condensed Milk, 36 lb.	Fat, 2 $\frac{1}{2}$ lb.
Glucose, 28 lb.	Flour, 10 lb.
Sugar, 4 $\frac{1}{2}$ lb.	Vanilla, 4 oz.

Proceed as for wrapped caramels, cooking to "crack," and adding later the fat and flour mixture.

## FUDGE VANILLA.

Demerara Sugar, 2 lb.	Milk, 1 quart.
White Sugar, 2 lb.	Butter, $\frac{1}{2}$ lb.
Glucose, $\frac{1}{2}$ lb.	Pinch of Salt.

Cook to "soft ball," then add butter, and bring to boil. Grain ;

## NOUGAT

add salt and vanilla essence. Run out on to paper, and cut with circular knives.

### MILK SQUARES.

Glucose, 30 lb.	Vanilla Essence to taste.
Sugar, 15 lb.	Honey, 2 lb.
Cocoanut Fat, 1 lb.	Marshmallow Base, 2 lb.
Gelatine Powder in $\frac{1}{2}$ pint water, 12 oz.	

Put sugar and glucose in pan, cook to  $256^{\circ}$  F. Pour on gelatine and beat up stiff. Add honey and marshmallow base, and stir in fat. Run in pan, and cut as caramel.

### DUTCH HOPJES.

Icing Sugar, 30 lb.	Fresh Butter, $\frac{1}{4}$ lb.
Melt these together in a kettle ; then add :—	
Condensed Milk, $\frac{1}{4}$ lb.	Coffee Essence, 1 oz.
Cocoa Powder, $\frac{1}{4}$ lb.	

Pass through rollers, cut out, and wrap in waxed paper.

(c)

### CREAMY NOUGAT.

Sugar, 35 lb.	Almonds, 3 lb.
Glucose, 15 lb.	Coarse Cocoanut, 12 oz.
Gelatine, Powdered, $\frac{3}{4}$ lb.	Vanilla Sugar, 3 oz.
Cocoanut Fat, 1 lb.	

Soak the gelatine in  $\frac{1}{2}$  pint of water, and place in Stirring-pan. Pour on boiling sugar cooked to  $256^{\circ}$  F. Beat well, and add the cocoanut fat, almonds, cocoanut and vanilla sugar.

### MONTELIMAR NOUGAT (CHOCOLATE COATED).

Montelimar nougat for chocolate coating should not be as hard as that which is sold in blocks. At the moment of putting in the almonds, it should be diluted with a little water which will make it slightly grainy and less sticky to the teeth. It is now cut into small cubes by

# THE MANUFACTURE OF CONFECTIONERY

the Nougat-cutting Machine The chocolate coating should be of superior quality.

## WHITE MONTELIMAR NOUGAT (BLOCKS).

Loaf-sugar, 32 lb.	Blanched Sicilian Pistache, 8 lb.
White Honey, 10 lb.	Albumen, $\frac{1}{2}$ lb.
Glucose, 30 lb.	Vanilline Sugar, $\frac{2}{5}$ lb.
Blanched Majorca Almonds, 44 lb.	

Dissolve the albumen in 3 lb. of cold water several hours before using. Put the almonds and pistache in the drying-room in order that they may be quite warm when required. Put the honey and the glucose into the Mixing and Beating-machine and mix with slight steam-pressure, so that the operation of mixing and beating may be slowly performed. It should occupy about two and a half hours. After an hour's beating the albumen should be passed through a sieve and then beaten up in an egg-whisk, and, when quite light and firm, it should be added to the mixing in the other machine. Now bring the 32 lb. of sugar to the "crack." This should be so arranged that the sugar, and glucose and honey should both come to the same point, namely, the "crack," in the same time. Add the boiled sugar and the vanilline sugar to the glucose and honey. Stop the Mixing-machine, and add the warm almonds and pistache, stirring with spatula. Then fill into frames, previously lined with wafer-paper, as quickly as possible, the same as in the case of fondant nougat. This nougat should be cut half-warm in  $\frac{1}{4}$  lb.,  $\frac{1}{2}$  lb., 1 lb. and 2 lb. pieces. Before the almonds are added, some marine blue should be mixed in, in order that the paste may be as white as possible. Care should be taken to keep it always protected from the air, as it easily takes up moisture. After cutting, it should be placed for a moment on a cold, clean marble slab, so that when cooling it may not lose shape. Use wafer-paper on top and bottom.

## FINE MONTELIMAR NOUGAT.

White Honey, 15 lb.	Blanched Sicilian Pistaches, 4 lb.
Glucose, 6 lb.	Glacé Cherries, 6 lb.
Loaf-sugar, 30 lb.	Albumen, $\frac{3}{5}$ lb.
Blanched Almonds, 15 lb.	Vanilline Sugar, $\frac{2}{5}$ lb.

Proceed as for the previous Montelimar nougat.

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### PARISIAN NOUGAT.

Crystallised Sugar, 28 lb.	Aleppo Pistaches, 4 lb.
Glucose, 40 lb.	Albumen, $\frac{1}{2}$ lb.
Unblanched Almonds, 36 lb.	Vanilline Sugar, $\frac{1}{6}$ lb.

Proceed as in the case of Montelimar nougat. It is made in all colours.

### DESSERT NOUGAT.

Crystallised Sugar, 28 lb.	Albumen, $\frac{1}{2}$ lb.
Glucose, 40 lb.	Vanilline Sugar, $\frac{1}{6}$ lb.
Unblanched Almonds, Chopped, 24 lb.	

Proceed as above. This nougat should be spread out in the frames to a thickness of  $\frac{1}{2}$  in., and covered on top and underneath like the others with a sheet of wafer. While still quite hot, it is turned upside down. While still half-warm, it is cut in strips 4 ins. long and weighing 25 to 50 to a lb. Each piece is wrapped in tinfoil.

### PROVENCE NOUGAT.

Moist Sugar, 12 lb.	Turkey Nuts, Chopped, 2 lb
Glucose, 12 lb.	Vanilline Sugar, $\frac{1}{6}$ lb.
Unblanched Almonds, Chopped, 10 lb.	

Boil the sugar and the glucose to the "crack," add the almonds and the Turkey nuts, warm; bank up the fire, and let the paste heat well for some minutes, and then add the vanilla sugar. Withdraw from the fire, and spread out the paste upon wafer paper. Cut like dessert nougat. This nougat is sold in bottles and is not wrapped. It is cut in pieces weighing 20 and 40 to the lb.

### ORDINARY WHITE NOUGAT.

Steeped Gelatine, 4 lb.
Fondant containing 25 per cent. Glucose, 120 lb.
Blanched Majorca Almonds, 30 lb.
Glycerine, 5 lb.

Heat the fondant as for casting. Then add the glycerine and steeped gelatine, mix well in the Steam Mixing-pan, and add the warm

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almonds. Spread out in squares upon wafer paper, like Parisian nougat, and cut in the same way, cold. This nougat is made white, pink and chocolate-coloured.

## FRUIT NOUGATS.

Fondant, 64 lb.

Preserved Fruits, 16 lb.

Citric Acid.

Four Colours : White, Red, Orange and Yellow.

For the white, heat in a “Bain-marie” 16 lb. of white fondant, flavoured with vanilla, and stir, adding 4 lb. of blanched pistachio nuts, half-dried. Pour the mass out upon paper between four iron bars, to the thickness of a finger, and cover over with another sheet of paper. Put a board on top, and let cool. Before cutting it in strips of  $1\frac{1}{4}$  ins. wide, care must be taken to beat the sheet of paste somewhat, so that the fondant may recover consistency and the dough be prevented from crumbling when touched. Then cut these strips in diagonals about  $\frac{1}{2}$  in. wide, with as great regularity as possible. Put these bon-bons to dry on paper ; six hours afterwards, turn them over, and, the next day, crystallise them cold, as with other bon-bons.

## RED FRUIT NOUGATS.

Cut up 4 lb. of preserved cherries into quarters. Heat 16 lb. of fondant as above, coloured red. Put in  $1\frac{1}{2}$  oz. of citric acid and the chopped cherries, and proceed as above.

## ORANGE FRUIT NOUGATS.

Proceed as above. Heat 16 lb. of fondant and colour orange ; then put in  $1\frac{1}{2}$  oz. of citric acid and 4 lb. of preserved and chopped orange peel.

## LEMON FRUIT NOUGATS.

Same proportions and method as above. Instead of oranges put preserved lemon peel. Colour a lemon yellow, and finish as above.

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## CHOCOLATE NOUGATINES.

Granulated Sugar, 1 cup.  
Confectioner's Glucose,  $\frac{1}{3}$  cup.  
Honey (strained),  $\frac{1}{3}$  cup.  
Paraffin Wax, a piece the size of a pea.  
Water,  $\frac{1}{4}$  cup.  
Salt,  $\frac{1}{4}$  teaspoonful.  
The whites of two eggs beaten dry.  
Almond or Walnut Kernels, chopped fine, 1 cup.  
Vanilla Essence, 1 teaspoonful.  
Covering Chocolate,  $\frac{1}{2}$  lb.

Put the sugar, glucose, honey, paraffin wax and water over the fire, stir occasionally and let boil to the "hard ball" degree, about  $248^{\circ}$  F. Add the salt to the eggs before beating them, and gradually pour on part of the syrup, beating constantly meanwhile with the egg-beater. Return the rest of the syrup to the fire, and let boil until it is brittle when tested in cold water, or to  $290^{\circ}$  F. Then turn this gradually on to the eggs, beating constantly meanwhile. Return the whole to the saucepan, set over the fire on an asbestos mat, and beat constantly until it becomes crisp when tested in cold water. Pour into a buttered pan a little larger than an ordinary bread-pan, and set aside to become cold. When cold, cut into pieces about an inch and a quarter long and three-eighths of an inch wide and thick. Coat these with covering-chocolate.

## GLAZED NOUGATINES, ASSORTED.

Melt the sugar and vanilline sugar without water over the fire in a clean pan, stirring constantly with the spatula. The fire must not be too sharp, until all the sugar is melted and has a light brown colour. At this moment, add the chopped almonds, previously heated in the drying-room. Mix the whole quickly away from the fire. Put the pan back upon the fire in order to warm the bottom so that the paste may easily be removed. Then pour quickly upon a Steam-heated Iron Table. Scrape the pan. Divide the paste into portions,

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and pass through the Drop-roller Machine with large, flat lozenge, designs. Cool, and then shake on coarse sieve to remove irregularities. Then put into a tin box, and close carefully until required for glazing.

## RASPBERRY NOYEAU.

Apricot-pulp, 1 lb.	Sugar, 2 lb.
Raspberry-pulp (no pips), 1 lb.	

Cook well, then grain. Add about 2 lb. icing sugar and about  $\frac{1}{2}$  lb. whole almonds. Roll out to required thickness, and place wafer paper on top and bottom of the sheet of noyeau. Cut with a sharp knife to desired shapes.

## FONDANT NOUGAT.

Crystallised Sugar, 52 lb.
Glucose, 24 lb.
Blanched Aleppo Pistachio Nuts and Almonds, 4 lb.
Albumen, $\frac{1}{2}$ lb.
Vanilline Sugar, $\frac{1}{5}$ lb.

Dissolve the albumen in 3 lb. of cold water for some hours beforehand, also warm the blanched almonds and pistachios in the drying-room. Boil the sugar and glucose to "small crack." A quarter of an hour before the boiling is finished, pass the albumen through a sieve, and beat in an egg-whisk. When the sugar is boiled, pour out into a Fondant Beater, preferably one of the screw type, if possible. Beat the boiled sugar a little. This cools it slightly and causes it to turn, both of which are necessary. In order to know if the sugar is sufficiently turned, take out a little on the end of a scraper. When it becomes disturbed and cloudy in colour, the albumen, beaten stiff, together with the vanilline sugar and such colour as may be necessary should be added. When the whole has been thoroughly mixed, stop the machine and add the warmed almonds and pistachios, mixing them in as quickly as possible with a spatula and scraping down the sides of the pan. Fill into large wooden frames lined with wafer paper, and level off the dough with a large iron roller. Moisten slightly the top of the paste with a sponge, and cover with a large sheet of wafer paper. Put on a heavy wooden board, and let the whole cool. Fill

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in the frames in this way until the whole batch is finished. This kind of nougat is made in all colours and flavours. The only variation is in these latter, the method of manufacture being always the same.

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### LIQUORICE CUT-GOODS.

Gum Siftings, 80 lb.	Glucose, 25 lb.
Crystallised Sugar, 50 lb.	Vanilline Sugar, 1 lb.
Essence Liquorice, 20 lb.	

Prepare the paste in the same way as for gum drops, without boiling. Make this paste somewhat thicker than those made for casting in starch. When it has been well clarified, let it cool down by half before filling into the jujube moulds. These moulds, which are square, with slightly raised edges, should be perfectly smooth and clean inside, and greased with a little olive oil. Put 1 lb. 5 oz. into each mould, and then put them in piles into the drying-room at 104° F. They require a week to dry. Watch, and take out in time. When the paste is sufficiently dry, take out into the open, and turn it over, then put back into the drying-room for a day or two. When that side is sufficiently dry, take them out, allow them to cool, turn them over in the moulds once more and leave in the open air for some days. Then take out of the moulds, and put the sheets of paste one upon the other into tightly closed tin boxes. Cut these sheets in the machine into squares or diamonds according as the sale demands. After cutting, place the goods spread out upon sieves, and dry for 24 hours in the open air. Then, with both hands, rub them together in a pan with a little vaseline. Pack in wax-paper in small boxes.

### COMMON LIQUORICE PASTE.

Flour, 70 lb.
Sugar, 84 lb.
Treacle or Glucose, 70 lb.
Sheets of Gelatine, steeped in water, 70.
Just enough Essence of Liquorice to colour paste.

Dissolve the gelatine sheets in water, heat the treacle, or glucose if preferred, withdraw from the fire and add the gelatine, dissolving same by stirring. Pass through a sieve over the flour in a large Steam Mixing-pan. When the mixture has been made, add the sugar,

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boiled to "soft ball," and finally colour with essence of liquorice. Let the mixing go on till the paste is quite smooth and with plenty of body. Put this paste into the Liquorice-press with every kind of die. Dry the goods in a drying-room, and then dip into gelatine solution in order to give them a shiny appearance. Dry and pack.

## LIQUORICE SHOELACES.

Pale Yellow Gum, ground, 32 lb.      Liquorice Essence, 24 lb.  
Crystallised Sugar, 32 lb.      Glycerine, 24 lb.

Melt the gum down to a thick liquid ; then add the glycerine, and pass through a sieve. Now add the liquorice essence and the sugar, boiled to "ball point." Mix the whole in a Steam Mixing-pan, and, when the paste is smooth and firm, put into the Liquorice-press with shoelace moulds, and finish as above. This paste with glycerine base does not crust or dry, and always remains soft.

Do not employ starch or potato flour in common pastes instead of wheat flour, as that would make them too brittle.

## WHITE LIQUORICE PASTE.

Icing Sugar, 100 lb.      Tragacanth Gum, 2 lb.  
Barley, 10 lb.      Orange-flower Water, 20 lb.  
Liquorice Root, 10 lb.      Pure Water, 20 lb.

Grind the liquorice root, and boil with the barley in the 20 lb. of pure water till all is reduced to 5 lb. in weight. Let stand, and draw off clear, and then mix in it the gum tragacanth with the addition of the orange-flower water. Let it steep for two days, then mix with the sugar in a large Mixing-machine to a rather stiff and quite smooth paste. Pass through the press with stick dies. Dry at a low temperature to give brilliancy. This paste should be straw-coloured.

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## MARSHMALLOWS No. 1.

Gum Arabic, 24 lb.      Sugar, 26 lb.  
Water,  $3\frac{1}{2}$  gallons.      Albumen, 10 oz.  
Glucose, 21 lb.

Dissolve the gum with the water, made hot. Sieve through fine sieve, and add 20 lb. of glucose. Place this mixture in a Beater with the beaters working. Beat till stiff. Then add 10 oz. of albumen,

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beaten stiff in a separate machine, and continue to beat till the batch is nice and light. Flavour and colour as desired, and run into warm starch.

### MARSHMALLOWS No. 2.

Mixing :—

Sugar, 25 lb.	Gelatine, 4 oz.
Glucose, 30 lb.	Egg Albumen (dry), 10 oz.
Starch, 3½ lb.	

Syrup for thinning :—

Sugar, 5 lb.	Water, 1 gall.
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Place into a Steam-jacketted Copper Pan 25 lb. of sugar and 30 lb. of glucose. Add, when necessary, a little water, and let it come to the boil. Dissolve 3½ lb. of lump starch in 5 quarts of water, stir and cook this batch until it leaves the finger. Shut off steam, and stir awhile, or else pour into a Beater and run slowly for about ten minutes. Now add 4 oz. of dissolved granulated gelatine. Dissolve 10 oz. of egg albumen, beat it very stiff, add to the batch *and beat on fast speed*. Dissolve 5 lb. of sugar in 1 gallon of water, and use this syrup to thin down the batch while beating. To dissolve the 10 oz. of egg albumen, add enough water to cover same, leave overnight, stir up well, then strain through a fine sieve. Always use warm starch for casting marshmallows in order to prevent crusting. Never use a tin or other metal vessel for soaking egg albumen, but soak it in an earthenware bowl, or else the albumen will turn red.

### MARSHMALLOWS No. 3.

Powdered White Gum, 17 lb.	Orange-flower Water, 17 lb.
Crushed Loaf-sugar, 13 lb.	Soaked Albumen, ½ lb.
Glucose, 5 lb.	Pure Water, 2½ lb.

Dissolve the albumen, cold, in the pure water three hours before use. Melt the gum warm with the orange-flower water. Pass through a fine sieve and put into a Marshmallow Mixing and Beating-machine with the crushed sugar and the glucose. Beat for two hours with just enough steam-pressure to keep the paste warm. Then beat to a very stiff froth half the dissolved albumen, and add to the paste. Mix for another two hours, keeping the paste warm, and then beat up the rest of the dissolved albumen very stiff like the first, and add it to the paste, shut off the steam, and continue to mix for

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about an hour in order to make the paste slightly more compact. Then pour out the paste into clean trays dusted with starch. The paste should be about the thickness of one finger and well dusted on top. Leave it to dry for three or four days in a drying-room at not more than 86° F. (30° C.). Turn over the paste, and leave it to dry until it can safely be piled up in layers without sticking. When it is dry enough and the drying is uniform throughout, cut into squares or diamond shapes in the Jujube-cutting Machine, dusting liberally with powdered sugar. Two days later it should be crystallised like the regular goods at 34° Baumé, after the sugar dust has been removed from them. Two days afterwards, when the first crystallising coating is quite dry, crystallise once more in a slightly thicker syrup at 35° Baumé. The goods thus made will keep soft inside for a very long time. They take 100 per cent. of crystal.

These goods may be dropped out into square moulds made in starch, and dried in a drying-room till firm. After the starch has been blown off, the pieces may be dusted with icing sugar and packed in boxes, or the marshmallows, after leaving the starch, may be covered in chocolate.

## LICHEN PASTE.

Powdered Yellow Gum, 25 lb.	Vanilline Sugar, $\frac{1}{5}$ lb.
Crystallised Sugar, 22 lb.	Liquorice Root, $\frac{1}{4}$ lb.
Glucose, 5 lb.	Liquorice Essence, $\frac{1}{4}$ lb.
Iceland Moss, $\frac{1}{2}$ lb.	Albumen, about $\frac{1}{3}$ lb.

Dissolve the albumen in 2 lb. of cold water three hours before use. Boil and reduce to one-half the lichen, the liquorice root and liquorice essence in 50 lb. of water. Let stand till well settled, and draw off clear. Then dissolve the gum in same, and pass through fine sieve. To this now add the glucose and the sugar, and beat the whole in the Mixing-pan. Beat as for marshmallow. Beat up the dissolved albumen very stiff, then add to the mixing and keep very hot, but not boiling, during the whole of the operation which requires at least six hours of beating. Add the vanilline sugar at the last. In order to obtain a fine colour, it is necessary to have at hand remnants of marshmallow and liquorice paste, which should be added an hour before finishing, in any proportions sufficient to give an attractive translucent yellow. Spread out in the jujube-moulds while still very

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warm, and place upon the Tapping-table, the paste being slightly thicker than the jujube paste. The moulds should be slightly greased. Dry for a fortnight at 86° F. (30° C.). Turn over in the moulds several times, and then place the sheets in piles, one upon the other, leaving them for several days till the paste is uniformly hard throughout. The paste may then be cut, and either crystallised or not as desired—when crystallised it is not so attractive, but it keeps soft longer than when not crystallised.

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### CLEAR GUMS.

Gum Arabic, 8 lb.	Glucose, 1 lb. 4 oz.
Water, 7 lb.	Japanese Jelly, 2 oz.
Sugar, 4 lb. 4 oz.	

Put jelly in pan, and cook till dissolved. Then add sugar and glucose ; cook to "string." Pour on melted gum, strain, put on the fire till boiled, when it hangs on spatula. Then take off fire, and add 3 oz. glycerine. Put in hot room to clear about four hours ; add colour and essence. Drop in hot starch, and leave in hot room about four days.

### HARD GUMS.

Gum Arabic, 42 lb.	Glucose, 7 lb.
Sugar, 28 lb.	Glycerine, 1 quart.

Place the gum in a Kettle, and cover with hot water. Cook until completely dissolved, and then strain through a fine sieve into a clean vessel. Cook separately the sugar and glucose to a light "crack" and pour, when slightly cool, into the gum mixing. Stir while pouring, and gradually add the glycerine. Let the whole stand overnight. Skim, and cook slowly for about two hours, never allowing it to boil. Colour and flavour to taste in the later stages of simmering. Then cast into good, clean, warm starch.

### TRANSPARENT GUMS.

Brush the starch off from the above gums and, in a cold Dragée Pan, run the hand, slightly oiled with odourless vaseline, through the batch, until the goods are all slightly oiled. Set out on clean trays and, after suitable rest, pack.

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## GUM DROP, No. 1.

White Senegal Gum, ground, 36 lb.	Orange-flower Water, 15 lb.
White Crystallised Sugar, 26 lb.	Pure Water, 20 lb.
Glucose, 5 lb.	

Melt the gum, which has been ground in the Gum Crushing Mill, with the orange-flower water and the pure water, in a Steam-pan, stirring gently with a large iron spatula. When the gum has been thoroughly dissolved, pass it through a very fine brass sieve. Then mix the filtered gum in a pan with the glucose and crystallised sugar, stirring very gently, till all the sugar has been dissolved. When this has been done, stop stirring and apply the steam at greater pressure till the liquor rises. When it has risen twice, pass again through the fine sieve, rubbing same with a large brush. Put the paste back into the pan with just enough steam-pressure to keep it warm without, however, letting it become yellow and lose colour. Leave it in this condition for four hours, without touching it, in order that it may have time to settle well and clarify.

Gum pastes in general should not be boiled. Melt the gum with a sufficient quantity of any liquid, whether pure water, fruit-juice, or distilled water, stirring gently and without heating too much. Then pass through a fine sieve, making use of a small wisp of straw to rub the face of the sieve and assist the passage of the gum. Then add the dry sugar and the glucose and other items, bringing the paste to the rise at least twice, and afterwards allow it to clarify. This clarification may be described as the separation of the scum which rises to the surface, and the pieces of grit and stone which fall to the bottom. We have long adopted the above method. It is quicker than the usual one which involves the boiling of the gum, resulting in always colouring too heavily and making the gum adhere to the side of the pans. By our method, the gum retains all its strength, is clearer and, consequently, of finer effect.

Print the starch trays in the Printing Machine, pass the drops in the Depositing Machine, as for fondants. Then put the trays, thus filled, one upon another, in the drying-room. Two days suffice for the drops to become sufficiently dry for crystallising. The syrup for the latter should be at  $35^{\circ}$  Baumé, and the crystallising should occupy 12 hours.

This recipe for Gum Drops, No. 1, may be taken as a basis for

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all the others, only the amounts of flavouring and of gum vary. Never remove the gum drops from the crystallising pan until they are perfectly dry, and afterwards agitate them as little as possible to prevent the whitening of the crystals.

Gum drops, when crystallised and packed in small boxes, in a dry, cool place, keep for a long time in good condition. The same may be said of all goods with a gum basis. The colouring of gum and similar drops is the same as for the other goods. When fruit-juices are used for gum pastes, they should be well filtered and transparent.

### WASHED GUM DROPS.

Washed gum drops are made with the same recipe and in the same way as Gum Drops No. 1. They are cast in raspberry-moulds, and, after drying, are washed by passing them through a jet of steam or simply water. Afterwards, they are allowed to dry in the air or in a drying-room, slightly warmed. They should be wrapped in wax-paper to prevent them from sticking.

### BLACK CALABAR LIQUORICE, OR ESSENCE OF LIQUORICE.

Black calabar liquorice should be of a shiny jet black and with no bitter taste. Dissolve the liquorice in four times its weight of water, and evaporate to half its bulk by gently boiling in a Steam-pan. When thoroughly dissolved, add four times its weight of crystallised sugar and 10 per cent. of glycerine, and, when the sugar is melted, pass the paste through a fine sieve, and use as wanted. Let us call this paste "essence of liquorice."

### GAITER BUTTONS, OR SMALL LIQUORICE DROPS.

Gum Siftings, assorted, 80 lb.	Essence of Liquorice 45 lb.
Gum Scum, 30 lb.	Essence of Aniseed, $\frac{1}{4}$ oz.
Crystallised Sugar, 44 lb.	Vanilline Sugar, $3\frac{1}{4}$ oz.

Dissolve the assorted gum siftings in a sufficient quantity of water, and add the gum scum and the sugar. Warm while stirring, and pass through a sieve. Then return to the pan, and add the essence of liquorice, the essence of aniseed and the vanilline sugar.

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Heat and bring the paste to a rise. Allow it to stand, remove the scum, and cast in the Depositing Machine into small, round moulds of the size of a gaiter button. Leave them to dry thoroughly in the drying-room until a drop allowed to fall upon a stone breaks easily. Pass the drops now through the Pneumatic Starch-cleaning Machine. Place the drops in a sieve, and pass for an instant over a jet of dry steam, then dry for a time in the drying-room. Separate the goods and then put into a clean cold Comfit Pan, sprinkling some drops of white, odourless vaseline oil upon them, allowing the machine to revolve for a short while, in order that the drops may become shiny without being greasy. These drops are made in the slack season, and are kept in large boxes as they come from the starch. They are cleaned and passed through the steam-jet only when required for sale. These drops keep indefinitely.

## GUM PASTE SCUM.

All gum paste scum should be cast in the gaiter button mould so that nothing is lost. In certain factories, liquorice pastes are sweetened with the scrap or siftings from hard-boiled goods. This is an error. No acidulated goods should be put into liquorice pastes, otherwise they become tarnished and sticky.

The more scum is used, the less gum is required.

## LIQUORICE BOATS.

The same recipe and method as for gaiter buttons, except that 35 lb. of essence of liquorice are to be used instead of 45 lb. The boats are cast into small moulds of oval shape, and are finished in the same way as the gaiter buttons. All gums cast in starch should be made with the Depositing Machine.

## VIOLET-FLAVOURED LIQUORICE DROPS, OR AGENT DE CHANGE.

White Gum, ground, 25 lb.	Sugared Ionone, $\frac{1}{4}$ lb.
Crystallised Sugar, 14 lb.	Infusion of Iris in Alcohol, 1 lb.
Liquorice Root, 1 $\frac{1}{2}$ lb.	Essence of Liquorice, 6 $\frac{1}{2}$ lb.
Glucose, 1 $\frac{1}{2}$ lb.	

Boil the liquorice root slowly in 20 lb. water until half the liquid has evaporated. Then cool and filter. This infusion must now be

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used to melt the gum, a sufficient quantity of water being added. Heat while dissolving, and stir gently, afterwards passing through fine brass sieve. Put back into the pan, and add the sugar, the essence of liquorice and the glucose, and bring the paste to a rise twice. Then pass again through the sieve, and add the infusion of iris and the sugared ionone, colouring if necessary. Let the paste now settle for four hours, keeping a small pressure of steam in pan to keep it warm. Skim and cast from the Depositing Machine in clean, dry starch, the moulds being smaller than those for garter buttons. Put into the drying-room for three days, the temperature being 104° F. (40° C.). Put into the Pneumatic Starch-cleaning Machine, pass through steam-jet, and then coat with vaseline as previously described. These drops are generally sold in small, fancy boxes.

### ROYAL PASTILLES.

Powdered White Gum, 50 lb.      Glucose,  $2\frac{1}{2}$  lb.  
Crushed Loaf-sugar, 25 lb.      Orange-flower Water, 30 lb.

Dissolve the gum in the orange-flower water, and add the glucose and sugar ; then pass through a fine sieve, and bring up the paste to a rise twice. Let it clarify, skim, and then cast with the Depositing Machine in the same moulds as the violet-flavoured liquorice pastilles.

These pastilles are made in three colours ; the recipe above is for the white ones.

### GOLDEN PASTILLES.

Powdered White Gum, 40 lb.      Honey (White), 20 lb.  
Crushed Loaf-sugar, 20 lb.      First-quality Brandy, 1 bottle.

Dissolve the gum in 30 lb. of water, add the honey and sugar, pass through a sieve, and bring twice to a rise. Then add the brandy, and colour a golden yellow. Cast in the Royal pastille moulds, and finish as above.

### GLYCERINE GUMS.

Gum Arabic, 25 lb.	Cream of Tartar, 1 teaspoonful.
Hot Water, $2\frac{1}{2}$ gallons.	Glycerine, 8 oz.
Sugar, 18 lb.	

Dissolve the gum in the water, and strain through fine sieve. Cook the sugar with 3 quarts of water and the cream of tartar to 300° F.,

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and add to the gum mixing, stirring continuously. Let simmer for about two hours, adding the glycerine, flavour and colour. Then cast into dry starch-moulds. Polish with vaseline if transparency is required.

### BRILLIANT WHITE GLYCERINE GUM PASTILLES.

Powdered White Gum, 56 lb.	Glycerine, 5 lb.
Crushed Loaf-sugar, 28 lb.	Citric Acid, $\frac{1}{5}$ lb.
Glucose, 5 lb.	Essence of Lemon, $\frac{1}{10}$ lb.

Melt the gum, and pass through sieve as above, then add the sugar, glucose and glycerine. Bring to a rise twice, and then add the citric acid and lemon essence. Let settle, and cast by means of the Depositing Machine in date-shaped moulds. Dry for three days in the drying-room, and then finish in the same way as the violet liquorice pastilles. Pastilles of all shapes, flavours and colours may be made with this recipe as base.

### DATE PASTE.

Stoned Dates, 5 lb.	Glucose, 2 lb.
Powdered White Gum, 20 lb.	Orange-flower Water, 5 lb.
Crushed Loaf-sugar, 2 lb.	Pure Water, 50 lb.

Cut the dates into small pieces, and boil with the 50 lb. of water till reduced to a paste. Pass through a sieve, and let settle. Draw off clear, and, with this, dissolve the gum. Then pass through fine sieve, and add the sugar and glucose, and let settle. Then finish as with jujube paste. Cut, and crystallise if required.

### FRUIT GUMS.

Steeped Gelatine, 24 lb.	Citric Acid, $1\frac{1}{2}$ lb.
Crushed Yellow Gum, 30 lb.	Almond Essence to flavour.
Sugar, boiled to "hard crack," 100 lb.	Apricot-pulp, 40 lb.
Glucose, 140 lb.	

Steep the gelatine in cold water overnight. Boil the sugar to "hard crack," add the glucose and the steeped gelatine. In another pan, dissolve the gum in 20 lb. water, heating slightly, but without bringing to boil. When the gum is dissolved, pass with the apricot-pulp through a fine sieve, and add the citric acid and the almond

## GUMS

essence. Mix the whole in a large pan and keep the paste warm, but not boiling. Allow it to settle during several hours, then skim and cast in starch with the Depositing Machine. Let the pastilles dry for a week in a drying-room. Take them out, and crystallise cold in syrup at 34° Baumé. These gums are made in considerable quantities in England, in all colours and flavours.

### AMERICAN GUMS.

Japanese Jelly, 2 lb.	Pure Water, 64 lb.
Crystallised Sugar, 64 lb.	Starch in Lumps, 2 lb.
Glucose, 64 lb.	Flavour to taste.

Steep the Japanese jelly for 24 hours before using, by cutting it into small pieces and putting into cold water. Remove from the water, which will have served to clean as well as steep it, and then put into a large pan with the 64 lb. of water, and dissolve at a slow simmer. When dissolved, pass through fine sieve. Then dissolve the starch in a little cold water, and put the whole of the recipe into the large pan, and boil to jelly-point (*forte nappe*), stirring the while. Then colour, flavour and acidulate according to taste. As soon as the paste is boiled, cast in starch in pastille moulds by means of the Depositing Machine. Two days in the drying-room at 104° F. (40° C.) is enough to dry them preparatory to crystallising cold as with the regular goods. These fancy gums come out at a very low cost. They are made in all colours and shapes.

### ICED DATES (FANCY GUMS).

Best-quality White Gelatine, 45 lb.	Citric Acid, 1 lb.
Sugar, boiled to "hard crack," 100 lb.	Essence of Lemon, 1 lb.
Glucose, 150 lb.	

Steep the gelatine in cold water for twelve hours, then boil the sugar to "hard crack," and mix in the glucose off the fire. Add the steeped gelatine when the glucose has been well dissolved, and finally add the acid and essence of lemon. Mix, and pass through a fine sieve. Let this paste stand for several hours, keeping it hot the while. Then skim, and cast by means of the Depositing Machine. Put it in the drying-room at 104° F. (40° C.) for a week, and then take out and finish in the same way as the violet-flavoured liquorice pastilles. These dates are made in all colours and flavours.

# THE MANUFACTURE OF CONFECTIONERY

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## FONDANT PRALINES IN THE COMFIT PAN.

Blanched Almonds, 10 lb.	Glucose, 4 lb.
Loaf-sugar, 40 lb.	

Warm the almonds in the drying-room, and boil 10 lb. of sugar with 1 lb. of glucose to "ball point." Put the almonds into a heated Comfit Pan; flavour the sugar with vanilla. Blue for white fondant pralines, or colour for coloured pralines. Put the Comfit Pan in motion, turning on the steam, and pour the sugar, boiled to "ball point," slowly on to the almonds, taking care to stop from time to time to see that the almonds do not form into masses. When the 10 lb. of sugar is finished, proceed with other 10 lb., and so on, being careful to keep the bon-bons always hot. When the pralines are finished, before taking them out of the Comfit Machine, they should be liberally sprinkled with cold water. Turn off the steam, stop the pan, and take out the fondant pralines in clean baskets. Next day, crystallise the pralines in the same way as other bon-bons. This method is much more rapid than by hand, and gives the same results. In the same way it is possible to make pralines with nuts, filberts, pistache, etc.

## ROASTED PRALINES, GREY AND RED, IN COMFIT PAN.

Turkish Nuts, 15 lb.	Glucose, 20 lb.
Small Almonds, 15 lb.	Transparent Melted Gum, 4 lb.
Crystallised Sugar, 120 lb.	

Roast the almonds as well as the Turkish nuts to a light yellow colour. Put the almonds and nuts, hot, in the Comfit Pan, likewise heated. Boil the sugar in batches of 10 to 15 lb., adding glucose in proportion. When it has been brought to "ball point," begin to pour it out upon the nuts as in the case of the fondant pralines. The workman should introduce his spatula amongst the nuts, in order to prevent them from gathering into masses. Allow the sugar to boil to "crack" while continuing to feed it in. When it is boiled, turn off the steam. Colour the sugar a little with caramel for the grey pralines, and put carmine into the paste for the red.

## PRALINES

Continue thus until the sugar and glucose have been used up. Then cover with melted gum before taking from the pan. Dry in the drying-room, and, next day, coat a second time with gum.

With a large Comfit Pan, well heated, two men can very easily make 8 cwt. a day.

### ROASTED CHOCOLATE PRALINES, COATED IN COMFIT PAN, No. 1.

Medium Almonds, 30 lb.	Unsweetened Chocolate, 10 lb.
Sugar Refuse, 105 lb.	Vanilline Sugar, 5½ oz.
Glucose, 15 lb.	Melted Gum, 3½ lb.

Proceed as above. The cocoa is mixed with the sugar the moment the latter is boiled.

### ROASTED CHOCOLATE PRALINES, No. 2.

Large Almonds, 30 lb.	Unsweetened Chocolate, 10 lb.
Crystallised Sugar, 90 lb.	Melted Gum, 3 lb.
Glucose, 10 lb.	Vanilline Sugar, 6½ oz.

### PINK ROASTED PRALINES, FLAVOURED WITH ROSE.

Large Almonds, 30 lb.	Distilled Rose Water, 10 lb.
Crystallised Sugar, 90 lb.	Melted Gum, 3 lb.
Glucose, 10 lb.	Carmine Paste, 8 oz.

Put the rose water into the syrup when the latter is nearly boiled, and proceed as above in other respects.

### ROASTED PRALINES, VANILLA FLAVOURED.

Almonds, 30 lb.	Melted Gum, 2 lb.
Loaf-sugar, 75 lb.	Vanilline Sugar, 6½ oz.
Glucose, 7 lb.	

Proceed as above.

### MONTESPAÑ HAND-ROASTED PRALINES.

Large Almonds, 6 lb.	Fine Butter, 12 oz.
Loaf-sugar, 12 lb.	Melted Gum, 4 oz.
Coffee Infusion, 1 lb.	

Melt the sugar in a large two-handled praline pan. When the

## THE MANUFACTURE OF CONFECTIONERY

syrup is at  $50^{\circ}$  Baumé, add the almonds ; stir with a large spatula to the bottom of the pan, in order that the almonds may not burn, until the sugar rises. Take off the fire, and put the pan upon a cask, and stir vigorously, which brings about the graining. When the sugar and the almonds separate, pour out the whole into a large-mesh sieve. Sift, and remove the sugar from around the pan, and rub the almonds in the sieve with a clean cloth in order to remove as much sugar as possible. Put back the almonds into the pan upon the fire, which should now be covered with ashes. Stir the almonds constantly with the spatula, changing the position of the pan from time to time in order to roast the almonds evenly, to a fine yellow colour inside. When the almonds are at this point, empty them into the sieve, and cover them so that they do not grow cold. Stir up the fire, and put into the pan about  $1\frac{1}{2}$  lb. of the grained sugar with a little water, and boil to "ball point." Then slowly add one-tenth of the total quantities of butter and coffee infusion. Stir slowly but constantly the bottom of the pan until the boiling has slightly passed the "crack." This point is easily recognised by slight blue fumes which rise and are irritating to the nostrils. Remove the pan quickly to the cask, throw in the almonds, and stir rapidly till the small quantity of sugar has coated all the almonds. As soon as the sugar turns, remove the almonds from the sides of the pan by a few turns of the spatula, and throw them vigorously into the sieve. Cover them so that they will remain warm. Repeat this operation till all the sugar, butter and coffee essence have been used up. From eight to ten batches are required, always boiled to the same point, to make fine pearled pralines. When all the batches have been made, gum the pralines while still hot, and put to dry in the drying-room, where, from time to time, they must be stirred in order to prevent them from sticking together. Some hours afterwards, when they are dry, again give them a coating of gum, and put to dry. The gumming should be done with a spatula in a clean pan. Use melted gum with 10 per cent. of vanilline syrup, warm and not boiled too high—that is to say, sufficiently liquid to run easily enough to moisten all the pralines. Thick coating is not necessary. It must make the bon-bons shiny, and nothing more. This is one of the best-eating bon-bons. All confectioners make roasted pralines, but few make them well. It is a tiring operation, and one requiring a great deal of attention. An experienced workman is needed to do it properly.

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### MONTESPAÑ ROASTED CHOCOLATE PRALINES.

The same proportions of sugar and almonds as the preceding, with 12 oz. of Unsweetened Caracas Chocolate and  $5\frac{1}{2}$  oz. of vanilline sugar. The cocoa and vanilline sugar are added to each batch in the same way as the coffee and butter in the previous recipe. Proceed as above.

### LOUIS XV ROASTED PRALINES.

Gros Flots Almonds, 6 lb.	Vanilline Sugar, $3\frac{1}{4}$ oz.
Loaf-sugar, 18 lb.	Melted Gum, 4 oz.

Proceed as above.

### SUPERFINE ROASTED PRALINES.

Medium Flots Almonds, 6 lb.	Vanilline Sugar, $2\frac{1}{4}$ oz.
Loaf-sugar, 22 lb.	Melted Gum, $4\frac{1}{2}$ oz.

Proceed as above.

### PRALINE NUTS FOR CENTRES.

Dauphine Nuts, 20 lb.	Vanilline Sugar, $1\frac{1}{2}$ oz.
Sugar, 25 lb.	

Cut the nuts into quarters, put them into a Comfit Pan, heat them by letting the pan revolve, and, while this is being done, boil the sugar to "ball" point. When it is boiled, put in the vanilline sugar, and ladle out on to the nuts, pouring in a thin stream. Do not pour too quickly at first, in order to prevent the nuts from bulking together. When all the sugar has been poured in, they are ready for coating with a medium-quality covering. The Spanish nuts are prepared in the same way.

### BURNT ALMONDS

Slightly roast 10 lb. of good, even almonds. Place in a Revolving Pan with steam to obtain slight warmth. Cook separately 60 lb. of sugar and 5 lb. of glucose to  $248^{\circ}$  F. Colour this syrup as desired, red, chocolate, etc. Run in the syrup into the almonds, about 1 pint at a time, until the desired size is obtained. Finish with the following syrup : 1 quart of gum arabic solution, sieved and clear ; and 1 quart of sugar syrup, as above, mixed and coloured to taste. The almonds, when dry, can be glazed in the usual manner.

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## SMOOTH SUGARED ALMONDS.

Jordan Almonds, 20 lb.	Water, 1 quart.
Gum Arabic (finely powdered), 2 lb.	

### GUMMING THE ALMONDS.

Pick, sift and brush the almonds, and place them on clean trays in a drying-room that is not too hot to encourage cracking or sweating out of oil.

Dissolve the gum in the water overnight. Next day, place the bowl on a hot-water bath, and stir slowly till the gum is dissolved. Then pass through a fine sieve.

Place the dry almonds into the cold Revolving Dragée Pan, and pour gradually the gum solution on to them from a ladle till the almonds are covered and no more. Add a little fine, powdered sugar at the end of this process till the gummed almonds have separated. Sift the almonds, and put them back into the pan which should now be slightly heated. When they are well dried, give another treatment with gum, sift again, and, if not dry, complete the drying in the hot room.

### GROSSING THE ALMONDS.

Best White Sugar, 17½ lb.	Water, 4 quarts.
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Dissolve the sugar and water in a copper or Steam-pan, and stir till dissolved. Without boiling, the syrup should show 35° on the syrup-gauge.

Take a ladleful of this sugar solution mixed with an equal quantity of the gum solution, and pour very gradually over the gummed almonds, again placed in the Revolving Pan. Only let sufficient syrup in to cover the almonds, and pass the hand through the almonds to facilitate the covering. As soon as the almonds begin to dry, cease the hand-rubbing. When the almonds begin to separate, dust them with finest, ground sugar and another charge of syrup composed this time of three parts of sugar syrup and one part melted gum. Proceed with dusting as before.

For the following four charges, use the sugar syrup without any gum, but, after every fourth charge of pure sugar syrup, add to the fifth a tablespoon of strong gum solution. If holes appear in the sugar coating of the almonds, shut off the heat of the pan, then give

## SUGARED ALMONDS

the almonds a charge of gum and sugar syrup. Run the hand quickly through the almonds, and, when the almonds are seen to be evenly covered, throw in some fine powdered sugar. Dry the almonds well, and sift. No sugar should be allowed to form on the side of the pan, and, after each sifting of the almonds, the side should be scraped clean.

### WHITENING THE ALMONDS.

Finest White Sugar, 11 lb. }  
Water                            } Boiled to 33° and kept warm.

Take the almonds from the Revolving Pan, and place in a drying-room till thoroughly dry. Clean out the Revolving Pan, place in the almonds, and add a charge of the warm syrup. Before the next charge is added, the almonds must be perfectly dry and commence to dust. The almonds should be cool at the first and warmer towards the end. For finishing the whitening, reduce the sugar in the syrup somewhat in the last four or five coats.

### FILLING.

Sugar, 6 lb.                    } Dissolved to 26°, and kept warm.  
Water                            }

Place the warm almonds in a clean, cold Revolving Pan, and give them enough syrup to cover them, running the hand through to secure uniform covering. When the almonds commence to dry, turn on a little heat. When they dust well, shut off the heat, and let them cool. Continue to charge the almonds till they are well filled, which will generally take 6-8 charges, to secure a good finish.

### RULES TO BE OBSERVED IN FILLING.

1. Use cooled almonds.
2. Use only sufficient charge to secure uniform wetness, and pass the hand through as soon as the charge is added.
3. Heat until well dried and the almonds commence to throw dust.
4. If the filling does not work well, thin out the syrup a little.
5. Avoid too large a charge, but especially too small a charge.
6. When well filled, heat slightly and dry thoroughly. Sift, and keep in drying-room at moderate heat till ready to smooth or polish.

# THE MANUFACTURE OF CONFECTIONERY

## FINISHING OR POLISHING THE ALMONDS.

Sugar } 30°-32° on sugar glass.  
Water } Used cold.

Clean out the Revolving Pan thoroughly. Place in the pan the filled almonds. Charge with the syrup, and let dry completely before another charge is added. Continue the operation of polishing by thinning down the last two or three charges of syrup and diminishing the quantity also. For finishing, heat the pan moderately and until the almonds are uniformly warm and begin to throw out dust. The almonds are then thrown into large paper-lined baskets ready for colouring or washing. The baskets should be shaken from time to time to prevent sticking. The colouring may, of course, be done in the syrup used in the polishing process.

## HAND-MADE WHITE DRAGÉES WITH ORANGE-FLOWER FLAVOUR.

Medium Flots Almonds, 24 lb.	Water, 3 lb.
Loaf-sugar, 37 lb.	White Gum, 3 lb.
Orange-flower Water, 10 lb.	Pure Alcohol, 1½ gills.

Melt the gum, and pass through a sieve. Heat the almonds in the pan, and then sift to remove dust. Return to the pan, and moisten with the melted gum, mixing the almonds thoroughly with the hand, so that all may receive a thin coating. When the almonds are dry, take them from the pan, and put into the drying-room till thoroughly dried.

## BULKING,

Dissolve 19 lb. of sugar with 6 lb. of orange-flower water. Pour this warm syrup over the almonds in the pan, a little at a time, which must also be kept warm. After each coating, dry thoroughly. To each third coating, add one-fifth of melted gum to the warm syrup. Pass the left hand frequently through the dragées in order to distribute the syrup equally, and so that the little holes in the almonds may be stopped up and the whole of the goods may be as smooth as possible throughout the various operations. This is absolutely

## DRAGÉES

necessary for good work. Only one operation per day should be performed with each lot of interiors.

### WHITENING.

Melt 10 lb. of sugar with 3 lb. of orange-flower water, and proceed as above.

### FILLING.

Melt 4 lb. of sugar with  $1\frac{1}{2}$  lb. pure water and  $\frac{1}{4}$  lb. of orange-flower water. When the sugar is well melted, add  $\frac{3}{4}$  gill of pure alcohol. During this operation especially, the coating must be carefully done, neither too much nor too little syrup at a time, and the drying should always be thorough. The dragées should be kept warm, but not hot.

### POLISHING.

Dissolve 4 lb. of sugar in 2 lb. of pure water, and then add three-quarters of a gill of pure alcohol. On beginning to coat, both the syrup and the dragées should be warmed, but gradually the heat of both should be reduced so that the last three coatings would be applied cold. Do not use gum during the polishing process. The last two coatings should only be partially dried, in order to prevent the dragées from being powdery. When thus finished, the dragées should be put into a clean bag, which latter should, from time to time, be rolled over upon itself in order to prevent the dragées from sticking. All the utensils employed should be kept perfectly clean.

### ROSE-FLAVOURED PINK FILBERT DRAGÉES.

Piedmont Filberts, 24 lb.	White Gum, 3 lb.
Loaf-sugar, 41 lb.	Pure Alcohol, $1\frac{1}{2}$ gills.
Distilled Rose-water, 20 lb.	

Proceed exactly as in the case of orange-flower flavoured almond dragées. Instead of 4 lb. of sugar for the filling process, 8 lb. should be used. Filberts are always more difficult to fill than almonds. In the polishing process, the syrup should be coloured to produce pale pink dragées.

All superfine dragées should be of very soft colours.

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## VANILLA-FLAVOURED PISTACHE DRAGÉES.

Sicilian Pistaches, 20 lb.	Powdered Vanilla, $\frac{2}{5}$ lb.
Loaf-sugar, 44 lb.	Vanilline Syrup, 2 lb.
White Gum, 3 lb.	Whites of Eggs, 3.

Coat the pistaches with gum as in the case of the almonds, adding a little granulated sugar to fill up the cavities. Moisten the pistaches, when hot, with syrup, composed half of melted gum and half of syrup, at  $30^{\circ}$  Baumé. When the pistaches are half dry—that is to say, when only the cavities are moist—add about 2 lb. of granulated sugar, in order to complete the drying and at the same time to fill up the holes which might still remain. Separate the sugar by sifting, and put the goods into the drying-room. The bulking should be done twice, with an interval of one day, and in batches of 11 lb. on each occasion.

For the whitening, use 12 lb. of sugar with three whites of eggs, prepared as follows: Beat up the three whites of eggs stiff, then add about 2 lb. of hot syrup taken from the batch prepared for the whitening process, with about  $\frac{1}{5}$  of a pound of melted gum. About a spoonful of this mixture should be used every two coatings in order to give a perfect white coating to the dragées. For the rest of the operations, proceed as in the case of the orange-flower flavoured almond dragées.

## ANISEED DRAGÉES.

Take 10 lb. of green aniseed and dry in the drying-room. Put them into a cold pan, and let revolve under a blast of air. Dust and tailings are thus removed. Gum and bulk as in the case of other dragées. The syrup should only stand at  $28^{\circ}$  Baumé when warm. Heat well, as this makes them hard and brittle. Finish off like other dragées. They are made in all sizes.

## DRAGÉES WITH SOFT CHOCOLATE INTERIORS.

Powdered Sugar, 14 lb.	Powdered Gum, 2 lb.
Unsweetened Chocolate, 6 lb.	Vanilla Sugar, $\frac{2}{5}$ lb.

Make a chocolate paste hard enough to roll out by hand without losing shape. Roll into the shapes of small olives, coating them with a crust of powdered gum. When the olives are firm enough, put them into the pan, and moisten slightly with cold syrup at  $30^{\circ}$  Baumé,

## LIQUEUR DRAGÉES

and then dry with powdered gum, cold. Let them dry in the open air till the following day, then coat several times with cold syrup at  $32^{\circ}$  Baumé. Do not warm the pan. The day following, add 7 lb. of bulking material warm, and heat the pan very little. The goods must not be heated through to the centre, otherwise they would lose shape, and all would be spoiled. The next day, proceed to the second bulking, using a little white of eggs as in the case of whitening the pistache dragées, in order to conceal the dark interior. Then proceed with the whitening and so forth, as already stated.

### HAND-MADE DRAGÉES, WITH LIQUEUR INTERIOR.

Cold Syrup at  $38^{\circ}$  Baumé, 7 lb.      Rum, or other Liqueur, 6 lb.  
Loaf-sugar, 7 lb.      Powdered Gum, 2 lb.

Mix the cold syrup ; add the liqueur. Boil the loaf-sugar to a "crack," and mix away from the fire, pouring the contents of one pan into the other, back and forth several times, until the whole is well mixed. Test with saccharometer, as this liqueur must be at  $37^{\circ}$  Baumé. Cover with a moistened paper or cloth, and let stand to cool. Then pour out by means of a running pot into dry starch, impressed with any mould desired, and let the starch-trays stand overnight in the drying-room. Next day, take them out, and carefully blow off the starch. Now put into crystallising syrup at  $33^{\circ}$  Baumé for twelve hours. Drain off when the crystal coating is thick enough. While still moist, put into the Dragée Pan with the powdered gum, dry well for half an hour, stirring from time to time gently with the hand in order not to break them. Finally coat in the pan as in the case of the soft chocolate centres. In some factories, a slight grain is put into the liqueur ; we do not recommend this system, especially for superfine hand-made liqueur dragées. The dragée is nicer and keeps longer without the grain.

### HAND-MADE CHOCOLATE LIQUEUR DRAGÉES.

Fresh Cream, 6 lb.  
Unsweetened Chocolate, 2 lb.  
Cold Syrup at  $33^{\circ}$  Baumé (Crystal Syrup may be used), 7 lb.  
Loaf-sugar, 7 lb.  
Vanilla Beans, 6.

Dissolve the chocolate, warm, in the cream, and add the syrup at

# THE MANUFACTURE OF CONFECTIONERY

33° Baumé. Boil one-third of this syrup with the loaf-sugar to "hard ball," stirring with a spatula. Keep the sides of the pan well sponged, a recommendation which applies to all liqueur goods, in order to prevent graining. Then mix the whole, as in the case of the other liqueurs, by pouring from one pan into another. Stand by to cool, and cast as above. Next morning, turn over these liqueurs in the starch-trays by means of bent wire so arranged as to take a whole row at once. Let them stand another day in the drying-room. Crystallise or coat in fine quality couverture. These goods *may* also be coated as above in the Dragée Pan.

## LIQUEUR DRAGÉES.

(*For the interiors see Liqueur Bonbons.*)

### GUMMING.

When the liqueur bonbons for dragée work are taken out from the crystallising process and are still moist, put them in small batches into the gumming basket (this basket is a pan made of coarse wire mesh, and used only for this work). Let this open wire pan revolve for several seconds till they are all uniformly moistened. Sprinkle over them in small quantities fine, dry, powdered gum. Then put into baskets or sieves, not too thickly, so that they may dry easily in the open air, as well as not break. If it is found that the crust of the liqueur bonbons is somewhat fragile, the next day, add a second gumming, moistening the bonbons with a light, cold syrup, and dry with powdered gum as in the first instance. When they are thoroughly dry, put into the Dragée Pan cold, and add several coatings of cold syrup at 40° Baumé. To the last of these coatings, add granulated sugar, in order to stop up any little holes there might be. Let them now dry in the open air for a day or two, and then bulk.

### BULKING OF LIQUEUR DRAGÉES.

Gummed Liqueur Bonbons, 40 lb.

White Sugar brought to Syrup at 38° Baumé, 30 lb.

As a general rule, the syrup for coating liqueur dragées is not flavoured.

Heat the pans but slightly to begin with. The centres should be treated only when the coating of sugar is already tolerably thick.

## METHOD OF POLISHING DRAGÉES

As in the case of the other dragées, add one-tenth of the coating of melted gum to all the third coatings, and, if there are still any small holes in the goods, add a little granulated sugar to the last coating during this process.

### WHITENING OF LIQUEUR DRAGÉES.

Bring 20 lb. of sugar to a syrup at 37° Baumé. The first coating should not be too warm, otherwise the liqueur dragées would break open. For liqueur dragées, gum should be put into syrup only for the bulking process, while for the whitening of the fine, superfine and extra dragées, to every third coating a little white-of-egg dressing should be added, and, in the last coating of this operation, one-tenth of the coating of the following solution to prevent them from scaling or chipping.

### WHITE LAKE GUM, DISSOLVED.

White Lake Gum, Powdered, 2 lb.  
Alcohol at 96° F., 8 lb.

Put this mixture into a jar in the drying-room, and stir it from time to time with a stick till the gum is dissolved. Three days suffice for this to be accomplished. Filter through paper. Bottle, and cork well, and use for all kinds of dragées susceptible to scaling, as explained above.

### FILLING AND POLISHING OF LIQUEUR DRAGÉES.

Melt 16 lb. of loaf-sugar to 37° Baumé. Put in these coatings carefully at a gentle heat. When about half the syrup has been used, dilute the remainder a little, and gradually diminish the heat in order to finish off cold as with almond dragées. These dragées are coloured exactly in the same way as almond dragées.

### METHOD OF VARNISHING DRAGÉES.

Fine and common liqueur dragées, and even the large dragées, are generally polished. The Cylindrical Polishing Machine, lined with flannel, is first half-filled with dragées, together with 1 lb. of spermaceti wax, in pieces of one or two ounces each. The machine is set revolving for about an hour, when the dragées will be sufficiently polished to be taken out, and another batch is put in with the same

## THE MANUFACTURE OF CONFECTIONERY

spermaceti. The machine should not turn too quickly, in order not to break the dragées. They should be examined pretty frequently as to whether the polishing is going on uniformly. The dragée should be polished in this way only when required for sale. Odourless spermaceti only should be used.

### POLISHED CHOCOLATE DRAGÉES.

Dragées which are scaled, spotted, split, or which have otherwise become unsaleable, may still be made use of when treated in the following manner :—

Cocoa Powder, 2 lb.      Syrup at 30° Baumé, 10 lb.

Dissolve the cocoa in the hot syrup, and pass the whole through a fine sieve. Put the unsaleable dragées into a clean pan, and coat with the above composition at a slight steam-pressure. A few coatings are sufficient to colour a beautiful dark brown. When they have taken this colour, turn off the steam, and coat carefully with two-thirds of glucose and one-third of the above syrup. Set the pan in motion. If, after the first glucose coating is dry, the dragées have not a good polish, add a second coating. It will not take long for them to become polished. They should be thoroughly dried before coming out of the pan. These dragées produce a fine effect in assorted goods.

### ROMAN DRAGÉES.

Roman dragées are put into lukewarm crystallising syrup at 36° Baumé for six hours. Then drain off, and remove from the crystallising pan only when thoroughly dry. Do not agitate them too much, in order not to tarnish the brilliance of the goods. They can all be prepared in this way. They are generally sold in fancy boxes. When the colours are well assorted, and some silver dragées are scattered over them, the effect is very beautiful.

### CHOCOLATE FONDANT DRAGÉES.

Small Creams, olive-shaped, 300 lb.	Syrup at 34° Baumé, 20 lb.
Chocolate Powder, 150 lb.	Melted Gum, 4 lb.
Powdered Sugar, 150 lb.	Vanilline Sugar, $\frac{8}{5}$ lb.

Treat the olive-shaped creams as if they were going to be coated with chocolate like other creams in a Dragée Pan. Put them into a

## DRAGÉES

large cold pan, and moisten cold with the syrup at 34° Baumé, to which 20 per cent. of melted gum has been added. Dry this covering with chocolate powder, and repeat the operation till the chocolate powder is finished. Then expose the goods in hampers in the open air, and, next day, moisten them with thin melted gum, flavoured with vanilla, drying this time with the powdered sugar. Next day, repeat the operation, and, on the following day, add some coatings of cold syrup at 38° Baumé. Afterwards coat them like liqueur dragées, with the smallest possible amount of sugar. When these dragées are carefully made, the interiors keep soft for a very long time. They are made in all colours.

## POLISHED CHOCOLATE BEANS.

Take 160 lb. boiled sugar, pull on a candy-hook, and pass through drop-rollers with haricot-bean shapes. The sugar should be flavoured with vanilla. Put these goods into a large pan, and moisten with the following composition :—

Melted Gum, 2 parts.      Syrup at 36° Baumé, 3 parts.

Prepare this mixture the day before, in order to use cold. Coat with this gum-syrup, and dry with 40 lb. of pressed cocoa in powder. Set the machine in motion, but without turning on the air-blast till the goods have been well polished. If, at the end of an hour, they are not polished, moisten again slightly with a little well-dissolved, pure gum, to which no cocoa-powder is added. They will not be long before being polished.

The same method may be applied to hard nougats, liqueur coffee-beans, peas and lentils of pulled sugar, etc. They taste well, and are of fine appearance. They are packed in wooden boxes, and keep for a very long time.

## FRUIT-PASTE DRAGÉES.

Apricot-pulp, apple or greengage-pulp, boiled down to half the bulk. Boil to "crack" the same quantity of sugar as of the pulp when reduced, mix the two, and cast from the Depositing Machine quite hot. The starch in the trays should be very dry. Cast in olive-shaped moulds, or small fruit and vegetable shapes. Crystallise for

## THE MANUFACTURE OF CONFECTIONERY

twelve hours as with ordinary bonbons. Then cover with powdered gum in the same way as liqueur bonbons, and coat in the same way. These dragées keep for a very long time.

### ALMOND-PASTE DRAGÉES, MADE ON THE GOOSEBERRY OR BALL MACHINE.

Almond Powder, 30 lb.

Fondant, made with 25 per cent. glucose, 40 lb.

Sugar, boiled to "crack," 80 lb.

Put the almond-powder and the fondant into the Mixing Machine and mix for a few minutes. Boil the sugar to "small crack," mix the whole together, and cool the paste. Then pass through the Two-roller Almond Grinding Machine with the two rollers set well apart to prevent the paste from becoming oily. Flavour to taste, and pass through the Gooseberry Machine with any design desired. When these goods are sufficiently dry, gum them, as in the case of liqueur dragées, and then coat in the same way. They are made in all colours.

### ALMOND-PASTE FONDANT DRAGÉES.

Take 160 lb. of fondant made with 25 per cent. of glucose, to which add, while hot and just before casting, 48 lb. almond-paste made with the following proportions :—

Blanched Almonds, 12 lb.

Sugar, 24 lb.

Glucose, 12 lb.

Rum Liqueur, 4 lb.

Grind the almonds with 6 lb. glucose, to which the 4 lb. of rum have been added. Grind to a very fine paste. Boil the 24 lb. of sugar and the remaining 6 lb. glucose to a "small crack." Mix this boiled sugar with the almond-paste. Heat the 160 lb. fondant, and to this add the above paste just before casting in starch with the Depositing Machine into small fancy shapes. Let these small fondants harden a little in the starch, and then crystallise, gum, and coat in the same way as liqueur dragées. These dragées are very good, and keep soft for a long time. They are made in all colours.

## DRAGÉES

### PEARLING BY HAND.

Hand-pearling is much superior to that done by machine. In both cases, the operation requires the greatest care. The following goods are generally pearléd :—

Berberries.	Rose Petals.
Cherry Kernels.	Liqueur Coffee Beans.
Melon Seeds.	Preserved Angelica Sticks.
Coriander Seeds.	Cocoa Beans.
Orange Flowers.	Cinnamon Chips, etc.

Boil the sugar to “crack,” mix in melted white gum to one-third of its weight, adding two whites of eggs, beaten up. Pour the boiling liquid in a thin stream over the goods, and have the gas-fire on full. Turn and agitate the pan without stopping ; put only one coat per day on to the goods. When the goods have been pearléd sufficiently, coat, while warm, with liquid white gum, and then stand out to cool, giving them a shake from time to time to prevent them from sticking together. Then, if not sufficiently shiny, coat a second time with gum. When working with the Pearling Machine, proceed in the same way.

### GUMMING.

Coating with gum is a very important point in all dragée-manufacture, but especially for almonds, nuts and pistaches. The gumming should, as far as possible, be done the day before, the goods being dried during the night in the drying-room. For gumming, use gum which has been well melted, and quite hot and strained through a sieve ; the almonds require to be only warm. If too hot, they would soon break through the spots where the surface had dried. They should be dusted with some handfuls of granulated sugar ; only a very little sugar should be used, just enough to fill up the cavities in the almonds.

### DEGREES OF DENSITY OF SYRUP FOR THE FOUR OPERATIONS IN DRAGÉE WORK.

Bulking	..	..	..	..	..	38°	Baumé
Whitening	..	..	..	..	..	38°	“
Filling	..	..	..	..	..	37°	“
Polishing	..	..	..	..	..	36°	“

# THE MANUFACTURE OF CONFECTIONERY

## SOFT CHOCOLATE INTERIORS FOR SUPERFINE DRAGÉES.

Powdered White Gum, 2 lb.	Loaf-sugar, $6\frac{1}{2}$ lb.
White Honey, 2 lb.	Vanilline Sugar, $\frac{1}{5}$ lb.
Unsweetened Chocolate, 7 lb.	

Dissolve the gum in 4 lb. of water. Boil the sugar and honey to "crack," and mix with the melted gum; then pass through fine sieve, and boil the whole to  $45^{\circ}$  Baumé or very "small ball." Add the cocoa and vanilline sugar, away from the fire, and stir the paste till cold. Then roll out into sticks, and divide into small olive-shapes, and let dry in powdered gum. Two days later, work them up as follows. Put the soft chocolate olives into the wide gumming-basket. Moisten these centres quickly with a light cold syrup, dry with a very fine, dry, powdered gum, and then put them into hampers and dry for a day or two in the open air. Afterwards, put several coatings, cold, with a syrup, thick but also cold, and again leave them to dry in hampers in the open air. The bulking may then be commenced. Whiten, fill, and polish as in the liqueur dragées.

## COFFEE BATCH.

Medium Flots Almonds, sorted, 30 lb.	Coffee, 3 lb.
Loaf-sugar, 64 lb.	Gum, 1 lb. 5 oz.

## BULKING.

Grind 3 lb. of coffee, and infuse with 3 lb. of cold water. Filter this infusion, and clarify, and then pour out on to the 30 lb. of sugar, and add the necessary water to produce a syrup at  $38^{\circ}$  Baumé. Coat the almonds as above.

Coffee infusion is always made cold, for all dragées. In this way, the essential oil of the coffee has no effect upon the dragées. For the fixing of the colour and polishing, proceed also cold, as this is the only way to secure a fine colour. For coffee dragées, the whitening process should be done with a little white of egg, so that the colour may come out clear. Fixing and colouring are one and the same thing. Polishing goes on from the beginning to the end of this operation; that is the technical term amongst the workmen. The two operations of bulking and fixing, the only two operations when coffee is put in the syrup, may deceive the workmen. As soon as the sugar on the goods begins to turn, it has the appearance of being

## DRAGÉES

dry, and yet is not ; the powdery appearance is a deception. The goods are certain to be dry only when the powder flies out from the pan.

### EXTRA-QUALITY ASSORTMENT OF ALMOND DRAGÉES, MADE UP OF SIX BATCHES.

Small Flot Almonds, sorted, 160 lb.	Distilled Rose-water, 8 lb
Loaf-sugar, 288 lb.	Vanilline Syrup, 2 lb.
Melted White Gum, 10 lb.	Iris, powdered, $\frac{2}{5}$ lb.
Coffee, ground and infused, 4 lb.	Crystal Starch, $\frac{3}{5}$ lb.
Orange-Flower Water, 8 lb.	Orange Skins, 24.

Divide colouring and flavouring as follows :—

One batch white, with vanilla flavour.

- „ „ white, with orange-flower flavour
- „ „ pink, with rose-water flavour.
- „ „ orange, with orange skin.
- „ „ coffee, with coffee.
- „ „ violet, with iris powder.

Gum 30 lb. of almonds. For the bulking, use 16 lb. of sugar at 38° Baumé, to which add four-fifths of a lb. of vanilline syrup.

The sugar for dragées should be well melted, but never boiled. For white dragées, the syrup should be whitened with a solution of marine blue. Sprinkle carefully, neither too much nor too little, and pass the hand through the dragées, when they are moistened by the syrup, as often as possible. Turn off the hot air the moment the syrup begins to turn, and, shortly afterwards, turn on the air again. Each coating should be well dried, especially those in which melted gum is used. To each third coating, add one-fifth of the melted gum, and observe the same rule for the bulking and whitening. If any crust forms on top of the syrup, sprinkle a little water to dissolve it. Scrape the pans after each operation when cold. Scrape, but do not tap. If the pans are still warm, tapping them while scraping loosens the rivets and puts the pans soon out of order.

### WHITENING.

Melt 16 lb. of loaf-sugar, and flavour with four-fifths of a pound of vanilline sugar. Make an emulsion of this syrup with one-tenth of a pound of starch mixed in a little cold water. Blue, and coat as for the bulking, adding a little gum at every third coating.

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## FILLING.

Melt 10 lb. of loaf-sugar to 37° Baumé, flavour with two-fifths of a pound of vanilline syrup, whiten with marine blue, and pour in as for whitening. Keep the dragées and the syrup warm. Pour in the syrup carefully, and dry thoroughly. Use no gum in this operation unless the dragées have been insufficiently gummed at the commencement, and are chipping.

## POLISHING.

Melt 6 lb. of loaf-sugar to 36° Baumé, let it cool a little, and whiten with marine blue. Pour in the first coating, warm, over the dragées, likewise warm. Reduce the heat of the dragées and the quantity of syrup gradually till the last one is very small in bulk. The coating before the last should not be fully dried, and the last still less. When the dragées are no longer wet, take them out quickly by means of a leather scoop or sieve, and put into a clean cloth bag or into hampers lined with cloth. Cover immediately, and jostle from time to time to prevent them from sticking. This work requires considerable care and great cleanliness.

## MEDIUM QUALITY ALMOND DRAGÉES.

For one batch :—

Plain Almonds, 20 lb.

Crystallised Sugar for Bulking at 34° Baumé, 30 lb.

Scrapings of Flour for Bulking 10 lb.

Crystallised Sugar for Whitening at 38° Baumé, 20 lb.

Crystal Starch for Whitening  $\frac{3}{5}$  lb.

Crystallised Sugar for Filling at 37° Baumé, 12 lb.

Crystallised Sugar for Polishing at 36° Baumé, 8 lb.

Pale Yellow Gum, 6 lb.

Gum every third coating, and do not put any scrapings when there is gum. Proceed as above. The sugar for bulking can be replaced by the syrup drained off from the crystallising pans, the scourings from sugar-boiling pans, or the scraps from the work-room.

## COMMON DRAGÉES.

The recipes for common dragées vary endlessly. The density of the syrup for this class of goods is lower only for the bulking-

## NOTES ON DRAGÉE WORK

process. Generally, the syrup is put to 34° Baumé. For the other processes, the degrees of density are the same as for other dragées. The principal point in this class of work is to know the exact time to add the flour. Coat carefully at first, and only add the flour when the syrup is turning, or partially dry—too soon, would make them lumpy ; too late, the flour would not adhere.

The drying should be more carefully looked after than for the dragées of pure sugar. The colouring of these common dragées should be brighter than for the better qualities. The flour or scrapings is only used during the bulking process, while, in the whitening process, three times the proportion of starch should be used. Except for the bulking, the work is the same as for other dragées.

### FOR ONE BATCH.

Broken Almonds, 24 lb.	Crystallised Sugar for Whitening, 10 lb.
Sugar Scrap, 10 lb.	Crystal Starch for Whitening, 1 lb.
Glucose, 40 lb.	Sugar for Filling and Polishing, 10 lb.
Flour, 20 lb.	Pale Yellow Starch, 4 lb.
Scrapings, 20 lb.	

Do the bulking with hot glucose, using cold air in the pan. The pans should revolve very slowly. Pass the hand through the goods, and dust with flour and scrapings as stated above (these two materials should be mixed dry, they thus stick better to the centres). Dry thoroughly, and only put in one-half the bulking material at once. Sift and put in drying-room, and add the other half of the bulking material the day following. To prevent the centres from sticking together, throw in a handful of coarse-grain sugar during the bulking-process, and then finish as above.

### NOTES ON DRAGÉE WORK.

Never coat cold dragées with hot syrup. The dragées crack on coming into contact with the heat. Whenever this occurs accidentally it may be remedied in the following manner :—

Boil to "hard ball" 4 lb. of loaf-sugar, and meanwhile beat up to a stiff paste the whites of four eggs, to which add  $\frac{1}{2}$  lb. of melted white gum. To this mixture add the boiled sugar. Take a half of this paste and the same amount of syrup at 40° Baumé, and mix.

## THE MANUFACTURE OF CONFECTIONERY

Apply this coating liberally, wetting the dragées well, then dry thoroughly. Two or three coatings are sufficient to cover up the defect. We specially advise the thorough drying of each charge ; that is essential to prevent spoiling. A single coating, imperfectly dried, is sufficient to spoil the whole batch. It sometimes happens that, when finished, the dragées have a fine appearance, but become spotted after a week's time. This is due to the fact that one or more of the first charges were not sufficiently dried, and the moisture has gradually come to the surface. In this condition the goods are no longer saleable, and should be pearled and not washed, although the latter is done in many establishments. Besides the loss of time, and often of sugar, the goods always remain imperfect. If only partially washed, it is almost impossible to stop at the exact point. If thoroughly washed, they lose a great deal of their flavour, and, besides, they have not sufficient firmness to pass through the coating-processes a second time. It has generally been remarked that the whitest dragées are those made with orange-flower water. Naturally, the perfume is not the cause ; that has been proved by experiment. Water, salted to 10 per cent. and then distilled, produces the same effect, and, as the operation in itself is inexpensive and is quickly performed, we especially recommend it for fine and superfine dragées. The result is superb white dragées and, consequently, coloured dragées of perfect clearness and beautiful effect. A good and inexpensive plan is to enclose in the boxes containing dragées for stock some vanilla beans wrapped in paper ; the dragées in this way absorb perfume which they retain for a very long time. In some establishments, the sorting of the almonds, filberts, pistaches, etc., for dragée-manufacture is done rapidly, the process sometimes being a simple sifting. This is an error. The work should be done carefully for several reasons. Broken pieces and powder are removed. These can be profitably employed for the interiors of hard nougat or praliné, but, unless removed from the dragée-process, they occasion endless care and delays on the part of the workmen and frequent deformities in the goods themselves.

### COLOURING OF DRAGÉES.

Dragées are all coloured in the following way :— After the filling-process, the dragées should not show the slightest cavity. Colour the syrup employed during the polishing-process at once to the colour

## NONPAREILLES

desired. To add colour to the syrup during the work is a bad method. After having added the colour, well mixed, to the syrup, test should be made by putting a drop of coloured syrup upon a sheet of very white paper, spreading the colour out so as to be able to gauge the effect. Extra and superfine qualities should be coloured in very soft tints ; only the common qualities should be in bright colours.

### NONPAREILLES DRAGÉES.

Small nonpareilles dragées have sugar centres. Take sugar passed through a fine hair sieve, without dust. Do the bulking, warm, with syrup at  $28^{\circ}$  Baumé in an Unperforated Pan. In order not to have to pass the hand through the goods, put into the pan four pieces of sheet iron 4 in. wide across the centre, but pointed at two ends, and standing upright in the pan, but kept in place by two pieces of wood placed crosswise, thus forming inside the pan four steps which, as the pan revolves, break the passage of the nonpareilles and prevent them sticking. The work is thus done very well without the necessity of the operator passing his hands through. In the case of pure sugar nonpareilles, the colouring should be done as for fine dragées.

### COLOURING OF NONPAREILLES.

Nonpareilles may be coloured by hand in the following manner :— Take 20 lb. of nonpareilles and put them in a clean pan. Sprinkle with a little liquid colour and some drops of acetic acid. Rub the nonpareilles vigorously with the two hands in order to make them of an equal colour. Dry in the open air in sieves. The operation requires only a few minutes.

Several dragées are made in the same way as the nonpareilles, but larger and in different sizes. Low-grade nonpareilles are made in the same way. They are bulked cold with glucose and powdered starch, flour or scrapings.

### NONPAREILLES.

Place 20 lb. of coarse granulated sugar in slightly warmed Dragée Pan. Cook separately 30 lb. of sugar and 1 gallon of water to  $236^{\circ}$  F. Run in the sugar syrup in fine threads into the granulated sugar in Revolving Pan till the balls are the size required. The syrup can be coloured and flavoured, if required, or the colour can be added to finish. The nonpareilles are removed from the warm pan, and placed in a Finishing Pan, where the necessary polish is given to them.

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## SILVERED AND GILDED DRAGÉES.

Sugar centres, balls of all sizes, seeds, nuts, etc., may be silvered and gilded. Small Glass Globes are used for this kind of work. The dragées are moistened with white of egg and various other solutions which are afterwards put into the globe with the silver or gold in leaf. They are left revolving till perfectly dried. Silvered or gilded dragées should be kept out of the sunlight which blackens them, as well as from bad odours.

(h)

## TURKISH DELIGHT.

Sugar, $6\frac{1}{4}$ lb.	Confectionery Starch, $1\frac{1}{2}$ lb.
Glucose, $3\frac{1}{2}$ lb.	Honey, $\frac{1}{2}$ lb.

Put starch in 1 qt. water and place in Steam-pan. Add sugar and glucose with 2 qt. water and a little cream of tartar. Cook to "string," add 1 drm. citric acid,  $\frac{1}{2}$  lb. honey,  $\frac{1}{2}$  drm. lemon essence.

## TURKISH DELIGHT OR RAHAT LAKOUM.

Starch (in so-called Crystal), 8 lb.	Japanese Jelly, $\frac{1}{5}$ lb.
Crystallised Sugar, 80 lb.	Vanilline Sugar, $\frac{2}{5}$ lb.
Pure Water, 80 lb.	

Dissolve the Japanese jelly in 70 lb. of boiling water, and the starch in 10 lb. of cold water. Add the solution of Japanese jelly gradually to the dissolved starch. When mixed, pass through a fine sieve, and then mix with the crystallised sugar in the Mixing and Beating Machine, with a slight steam-pressure, as the paste must be kept warm during the whole operation which lasts about six hours. The paste may be considered sufficiently cooked and beaten when it no longer adheres to the hand when striking it. Pour out the paste into trays  $1\frac{3}{4}$  ins. deep, and powder with starch. Dust over with starch, and let it stand to cool. Afterwards cut in sections weighing about 4 oz. Let them dry in powdered sugar before packing. The vanilline sugar is added to the paste after the latter has been cooked. The same paste may be used also to make almond sausages.

## CHOCOLATE-COATED ALMONDS

### ALMOND SAUSAGES.

String fine blanched almonds by means of a needle upon a strong thread six or eight inches long, leaving a fairly long piece at each end. Now dip these almonds, thus threaded, into the paste of Turkish delight, and repeat the operation until coated to the desired thickness. When the sausages are cold, withdraw the thread, and wrap in wax-paper.

### CHOCOLATE PEANUT CLUSTERS.

Shell a quart of freshly-roasted peanuts, and remove the skins. Drop the peanuts, one by one, into the centre of a dish of covering-chocolate made ready for use. Lift out on to oil-cloth with a dipping fork to make groups of three nuts, two below, side by side, and one above and between the others.

### CHOCOLATE-COATED ALMONDS.

Select almonds that are plump at the ends. Use them without blanching. Brush, to remove the dust. Melt covering-chocolate, and, when cooled properly, drop the nuts, one at a time, into the centre of it. Push the nuts under with a fork, then drop on to waxed paper or oil-cloth. In removing the fork, make a design on the top of each nut. These are easily prepared and are particularly good.

### COATED BON-BONS WITH NUT INTERIORS.

Blanched Almonds,  $2\frac{1}{2}$  lb.

Glucose, 8 oz.

Peeled Spanish Nuts,  $\frac{1}{2}$  lb.

Coffee Essence, 8 oz.

Sugar, 6 lb.

Heat the 8 oz. of coffee essence with the 8 oz. of glucose, cool, and then pass together with the almonds and nuts to the Refining Machine, and make a very fine, soft paste. At each passage through the machine, moisten the paste to prevent it from becoming oily, and, at each passage likewise, bring the rollers closer together. Boil the sugar to the "ball" point, and incorporate in the dough by means of a small Mechanical Kneader. Put this finished dough upon a clean marble slab till cool, then return to the Refining Machine, with rollers well apart. Once through is enough. Roll out in sheets, and cut in squares. Coat with coffee fondant.

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## SUPERFINE NICE BON-BONS.

Blanched and Roasted Nuts, 1 lb.	Powdered Sugar, $5\frac{1}{2}$ oz.
Extra Chocolate Dough, 1 lb.	Mexican Vanilla to flavour.

Grind the whole very fine in the Reducing Machine. Cool the dough, and work it over with a scraper till it begins to grow solid, and then put the dough into a press fitted with an oval die, and cut the bon-bons off, as the dough comes out from the die, in pieces of about  $1\frac{1}{4}$  in. thick upon glazed paper. Cool ; then wrap each piece in tinfoil. The working of the dough through the press requires a certain amount of skill.

## FRENCH COCOANUT KISSES.

White Sugar, 10 lb.	Butter, 4 oz.
Cream or Condensed Milk, 2 quarts.	Strip Cocoanut, 4 oz. to 2 lb.
Cream fondant (stock), 6 lb.	

Set sugar and cream or condensed milk on a medium fire, stirring until the sugar is dissolved. Wash down the sides of the pan, and stir and cook to  $236^{\circ}$  F. Add the cream fondant, and stir until melted. Now add the butter and enough cocoanut to make a medium stiff paste. Lay out the " kisses " with a spoon on to waxed paper.

## COCOANUT DROPS.

Sugar, 5 lb.	Glycerine, 2 oz.
Water, 1 quart.	Fine Cocoanut, 2 oz.—1 lb.
Cream Fondant (stock), 5 lb.	

Cook sugar and water to  $234^{\circ}$  F. Add the cream fondant and the glycerine, and stir until melted. Work in the cocoanut until a fine paste is obtained and, after flavouring with vanilla or lemon, drop out on to wax-paper with rubber bag.

## BRIGHT LIQUEUR COCOA BEANS.

Loaf-sugar, 10 lb.	Fresh Cream, 3 lb.
Unsweetened Chocolate, 2 lb.	Vanilline Sugar, $1\frac{1}{2}$ oz.

Mix the chocolate, fresh cream and vanilla sugar in the warm. Boil the loaf-sugar to " small crack," and mix into it the first mixing, passing the liquid from one pan to the other three or four times in succession. This mixture should be at  $37^{\circ}$  Baumé

## PEPPERMINTS, ETC.

Cover with a moist cloth, let it cool, and then pour by means of a pouring-pot into cocoa-bean moulds made in dry starch. Powder the tops of the bon-bons with starch, and leave for a night in the drying-room. Next day, pass them through the Air-brush Starch Cleaning Machine, not too cold, so as to prevent them from breaking. Crystallise as for ordinary bon-bon work and, when the syrup is drained off, but while the goods are still damp, put them into the gum-basket, and dry them with cocoa powder, this latter with an addition of 20 per cent. of vanilla sugar, powdered. Let them dry in sieves in the open air. Next day, moisten them with a little cold syrup, made of two-thirds syrup at 34 degrees and one-third melted gum, and let revolve in a Comfit Machine, cold, and without air-blast. If at the end of an hour they do not begin to shine, moisten them again, this time by dipping the hand into the pure liquid gum and passing it lightly into the mass of bon-bons. They will now not be long in becoming bright. This work is best done, and most quickly, when the machine is not scraped.

## BRIGHT CHOCOLATE LIQUEUR COFFEE BEANS.

Broken Loaf-sugar, 10 lb.                   Essence of Coffee, 4 lb.

Grind 1 lb. of coffee, and infuse it with  $4\frac{1}{2}$  lb. of boiling water. When the infusion is made, filter and remove 4 lb. of coffee essence. Put these 4 lb. of essence on to the sugar, in order to melt it. When it has been melted and brought to a boil, skimmed and passed through a sieve, cover with a damp-cloth and allow to cool. For the rest, proceed as with bright cocoa beans. These bon-bons are cast in large coffee-bean moulds.

## PEPPERMINTS, CHOCOLATE MINTS, ETC.

White of one Egg.

Cold Water, 2 tablespoonsful.

Sifted Confectioner's Sugar.

Essence of Peppermint, or a  $\frac{1}{2}$  teaspoonful or to flavour.

Sweet Chocolate, 1-2 oz.

Green Colour Paste.

Pink Colour Paste.

Beat the egg on a plate, add the cold water, and gradually work in sugar enough to make a firm paste. Divide the sugar paste into

# THE MANUFACTURE OF CONFECTIONERY

three parts. To one part add the peppermint and a very little of the green colour paste. Take the colour from the jar with a wooden spoon, and add but a little. Work and knead the mixture until the colour is evenly distributed throughout. Roll the candy into a sheet one-fourth of an inch thick, then cut out into small rounds or other shapes with any cutter that is convenient. Colour the second part a very delicate pink, flavour with rose-extract, and cut out in the same manner as the first. To the last part, add one or two ounces of sweet chocolate, melted over hot water, and flavour with peppermint. Add also a little water, as the chocolate will make the mixture thick and crumbly. Begin by adding a tablespoonful of water, then add more if necessary. Knead and cut these as the others.

## STUFFED DATES, CHOCOLATE-DIPPED.

Cut selected dates open on one side, and remove the stones. Fill the open space in the dates with a strip of preserved ginger or pine-apple, chopped nuts, or chopped nuts mixed with white or chocolate fondant. Press the dates into a compact form to keep in the filling, and, after drying, dip them, one by one, in covering-chocolate.

## CREAM CHOCOLATE.

Take  $\frac{1}{2}$  pint cream ; bring to a boil with 2 lb. of sweet chocolate covering, and mix well with vanilla to taste. Take out, and put on cold marble. Work like fondant until you can make a ball.

Roll out into small balls, dip in chocolate, and roll in cocoa powder.

## CHOCOLATE-COATED COFFEE-FLAVOURED WALNUT BON-BONS.

Coffee Fondant, 1 lb. Sliced Nuts,  $1\frac{1}{4}$  oz.

Mix the sliced nuts in the coffee fondant when beating same. Roll the paste into small flattened balls, and cover them with good chocolate coating.

## BRANDIED MALAGA RAISINS FOR COVERING WITH CHOCOLATE.

Cognac, 2 parts. Water, 1 part.  
Alcohol, 1 part.

Soak the raisins in the above liquid till well swollen. Then cover the raisins in good covering-chocolate, by hand.

## FANCY BON-BONS

### PASTE FOR ROYAL MIXTURE.

Crystallised Sugar, 30 lb.	Powdered Sugar, 100 lb.
Glucose, 30 lb.	Good Gelatine, 25 sheets.

Put the 25 sheets of gelatine to soak overnight. Put the 100 lb. of powdered sugar into the Kneader after passing through a sieve. Boil the 30 lb. crystallised sugar to "ball point." Add to this the glucose, and mix well; then add the steeped gelatine. Now pour the whole into the powdered sugar in the Kneader, and set the machine in motion, and mix till the paste is quite uniform, smooth and with some body. All kinds of small fancy goods are made with this paste, such as small cornucopia, with a half of preserved cherry inside, small three-cornered hats, dice, dominoes, small fancy shapes cut with dies. This paste is not crystallised, and remains soft for a very long time. This work is done by hand by young girls.

### RASPBERRY BON-BONS.

Apricot-paste, flavoured with raspberry essence, and slightly acid. Cast in round shapes. Rose-water glaze, flavoured with raspberry essence.

### LEMON BON-BONS.

Lemon-juice filtered through a fine sieve, mixed with powdered sugar. To this paste add 5 per cent. of glycerine and 5 per cent. of glucose to prevent it from drying. Make the paste of a consistency suitable for rolling out, and cut into small rectangular pieces. Glaze with water-glazing of a light yellow colour, and flavour with lemon.

### ORANGE BON-BONS.

Same methods as for the lemon-paste, but with orange-juice instead of lemon-juice. Glaze with water-glazing, orange-flavoured, orange-coloured, and cut in triangular pieces.

### PLUM BON-BONS.

Plum-pulp boiled, cast in starch, in plum-shaped mould, as with the apricot-pulp, and in the same proportions. Glaze with water-glazing, flavour with vanilla, and colour a pale pistache-green.

# THE MANUFACTURE OF CONFECTIONERY

## ALMOND BON-BONS.

Fine almond-paste, flavoured with vanilla, rolled to a sheet, and cut with almond-shape cutter. Glaze with water-glaze, vanilla-flavoured. Do not colour the glaze, blue slightly.

## NICE BON-BONS.

Same paste as above, flavoured with ionone, and rolled out to a sheet, and cut in cubes. Glaze with water-glaze, flavour with ionone, and colour pale violet.

These six classes of bon-bons make a fine assortment, they should be packed with care and in symmetry.

## CRYSTALLISED FILLED FRUITS.

Plums filled with almond-paste, red and orange.

Cherries „ „ „ yellow and red.

Dates „ „ „ green and orange.

Muscate raisins „ „ „ pink, green and orange.

Open the plums, take out the stones, and leave them to dry for a night in the drying-room. Next day fill with almond-paste, flavoured and coloured red with raspberry ; and orange, with orange. Roll this paste into small balls, and close it three-quarters in the plums which are then squeezed slightly between the two fingers, giving them a pretty shape. Dry in the drying-room, and crystallise in the syrup for twelve hours. Proceed in the same way with cherries, dates and muscate raisins. This work should be done by young girls

## PEBBLES, MUSSELS, SHELLS.

Icing Sugar, 50 lb. Tragacanth Gum,  $4\frac{1}{2}$  oz.

Water, 3 lb. Peppermint Essence,  $1\frac{1}{2}$  oz.

Melt the tragacanth gum with the 3 lb. of water, and pass through sieve. Put this paste, with the flavouring, into the Steam Mixing-Pan, and add the sugar till the paste is perfectly smooth and with plenty of body, and firm enough to be worked up by hand. Divide the paste and colour as follows : 5 lb. dark grey, 3 lb. bright red, 2 lb. brick-orange, 2 lb. smoke-black, 1 lb. dark blue, and the rest white, well blued. Take about nine-tenths of white paste and one-tenth of the other coloured pastes, and roll them separately into rolls : the white

## CHEAP MIXED SWEETS

of the size of an arm, the others in smaller strips of the same length. Stick these smaller strips about the large white roll, irregularly ; roll out the whole to the size of the small finger, and cut with a knife into small pieces to the size of about six to the ounce. Roll these to square, olive, round, oval and conical shapes. Put them upon sheets of wax-paper, and leave to dry in the open air, and, the next day, turn them over. When they are quite dry, pass them through steam in a sieve over a pan of boiling water in order to melt the powdered sugar which there might be upon them, and to render them brilliant. Then leave to dry, and pack in bulk. The mussels, shells and flattened pebbles are made from the same dough, the two first in moulds of hardened sulphur, and the latter rolled and flattened by hand. These moulds represent all kinds of shells and marine mussels.

## CHEAP MIXED SWEETS.

Mixed sweets are made with a fine loaf-sugar. Melt 50 lb. of sugar, and blue same. Boil to " ball point " in small batches of 3 lb. When the syrup is brought to this point, add a pinch of granulated sugar, let it boil a little, and withdraw from the fire. With a round stick stir slowly against the bottom of the pan in order to agitate the sugar a little. Cast in starch, in shapes of hearts, crosses, helmets, swords, guns, clocks, watches, chairs, trumpets, harps, bugles, clarionets, animals, birds, flowers, etc. Stand to dry in the starch overnight in the drying-room. Next day pass through the Air Brush Starch-cleaning Machine and then decorate. These bon-bons, well decorated, are very pretty and keep for a long time. They should be made during the off season to occupy the staff. When decorated and dried, they should be coated with bon-bon varnish.

## AMBER MIXTURE.

Gelatine, 25 lb.  
Sugar, 25 lb.

Glucose, 40 lb.

Steep the gelatine just enough for the water to soak to the centre. Boil the sugar to 40° Baumé in a Steam-pan. Turn off the steam

## THE MANUFACTURE OF CONFECTIONERY

and mix in the gelatine and, when the latter is well dissolved, add the glucose. Put this paste into the Marshmallow Mixer and Beater with just enough steam to keep it warm. When it has been beaten to a light paste, cast in starch by means of a depositing bag fitted with a conical pipe in the same moulds as for mixed sweets of pure sugar. Stand for a night in the drying-room, and, next morning, when they have been well cooled, pass through the Air Brush Cleaning Machine. They are then decorated and varnished like the preceding.

### VICTORIA CALISONS.

Fruit-syrup, 48 lb.      Sweet Powdered Almonds, 12 lb.

Boil the fruit syrup to "ball point." Pour the boiled syrup upon the powdered almonds in the Steam Mixing-pan with vertical scraper, and make the mixing with slight pressure of steam, continuing till the paste no longer adheres to the hand if brought in contact with it. Pour out and cool upon a marble slab. When it is cold, roll out to a sheet  $1\frac{1}{4}$  in. thick upon a wafer-sheet. Glaze the top with glacé royale, and allow the glazing to harden. Then cut with a small oval cutter. Next day toast for a few minutes in a gas or other oven till it acquires a beautiful light brown colour. From the same paste, roll some balls of the size of pigeon eggs, and crystallise same. Then put into heated wafer-irons so as to burn slightly the parts touched by the irons. These bon-bons taste excellently, and keep soft for a long time. The paste may be slightly acidulated and coloured to taste.

### CREAM PANACHE.

Best Covering-Chocolate, 5 lb.

Cream (or half Cream and half Milk), 2 pints.

Strawberry Pulp, 12 oz.

Strawberry Essence, trace.

Melt the couverture, and boil the cream (or milk and cream). Whisk the chocolate and cream together thoroughly, standing the pan in the cold and continuing to whisk till the mass is very thick. Add the pulp and essence, and then bring to a consistency so that the whole can be cast in starch.

## ALMOND-PASTES

### POPCORN.

Popcorn, dried in the shade, 80 lb.	White Gum, 5 lb.
Sugar, 24 lb.	Vanilline Sugar, $\frac{1}{5}$ lb.

Make a thick solution of the gum, and pass through a fine sieve. Make a syrup of 40° Baumé with the 24 lb. sugar, mix the gum and the vanilline sugar into the syrup, and coat the 80 lb. of popcorn with this mixture, warm, in a pan. Afterwards put the corn into a closed wire cage and hang over the stove with a good, sharp fire. Agitate the cage constantly. The grains of Indian corn burst open, and the sugar melts around them. When all the grains have burst, empty the cage upon a table dusted with vanilla sugar. Wrap the popcorn immediately in wax-paper, in balls.

A more usual method is to pop the Indian corn in a wire cage over a stove, then mix the corn with fine molasses, well-cooked.

(a) 4

### MARZIPAN ALMOND-PASTE.

Almond-powder (sweet), 15 lb.	Vanilline Sugar, $1\frac{1}{2}$ oz.
Loaf-sugar, 12 lb.	Yolks of Eggs, 40.
Powdered Sugar, 8 oz.	

Mix the yolks of eggs with the powdered sugar and the vanilline sugar. Boil the loaf-sugar to 38° Baumé, and add the almond-powder and the yolks of eggs when off the fire. Cool the paste upon a marble slab. This paste can be dressed or moulded in all shapes. When mixed with fresh cream, heated and cast in starch, it makes an excellent interior for chocolate or other coated bon-bons, dipped in coating material. If prepared with fresh cream, these bon-bons do not keep so long.

### FINE ALMOND-PASTE FOR MOULDING.

Almond-powder (Majorca), 13 lb.	White Sugar, 45 lb.
Fondant, with 25 per cent. Glucose, 17 lb.	Glucose, 5 lb.

Grind the blanched and dried almonds in the Almond Mill. If the powder is not fine enough, pass it once through the Granite Roller Mill. Put this powder into the Mechanical Kneader, and mix it cold

## THE MANUFACTURE OF CONFECTIONERY

with the fondant for five minutes. Boil the sugar and the glucose to "crack," and pour the whole slowly into the Kneader while in motion. When the mixing is complete, remove, and spread the dough upon a slab, and let it cool. Then pass it through the Granite Roller Mill in small batches to bring it into a dough condition again. Pass it once or twice more, each time bringing the rollers closer together, so as to have a smooth paste with plenty of body. If it is too hard, add a little syrup drained from crystals. Then divide up the dough, flavour and colour it as required. With the dough thus prepared, a large variety of very good and beautiful bon-bons may be made. Generally the work of moulding is done by young girls who very soon become very quick. Mosaics may be made, cut into squares and with various designs inside; bee-hives also, which are filled with honey-meringue in the interior; reels of thread filled with vanilla-meringue, corks filled with praliné paste, all kinds of imitations of fruit, filled with fruit-jelly or other soft paste, or simply with perfumed fondant, according to the selling price. All these bon-bons may be crystallised.

### NOISETTE CREAM.

Hazel Nuts, 2½ lb.	Unsweetened Chocolate, ¾ lb.
Sugar, 2 lb.	Cocoa Butter, ½ lb.
Couverture, 5 lb.	Vanilla Essence, to flavour.

Warm the shelled nuts in an oven, and rub the brown skins from the kernels by rolling between coarse sacking. Heat the skinned nuts and sugar in a copper pan till all the sugar is melted, taking care not to darken the sugar unduly. Throw the batch on to a cold, oiled slab, and break up, when cold, into the smallest possible powder. Melt into this the couverture. Melt separately the bitter chocolate and cocoa butter. Then mix and heat all together to a smooth paste, passing it if possible through Granite Rollers. Roll out into a sheet  $\frac{1}{2}$  in. thick and, when set, cut into small squares, rounds and ovals. Cover with good covering-chocolate.

### SOFT ALMOND CENTRES.

Fine Powdered Almonds, 10 lb.	Sugar, 40 lb.
Glucose, 5 lb.	Fondant or Cream Paste, 20 lb.

Put the fondant and the almond-powder into a Mixer, and work for several minutes; then stop the machine. Boil in a Steam-pan the

## ALMOND-PASTES

sugar and glucose to "ball point," and then pour out upon the dough in the mixer, while the latter is in motion. Allow the mixing to go on for a quarter of an hour, adding perfume and colouring matter, if required. Then heat and cast this paste as for creams, using for this the Depositing Machine, and in moulds of all shapes, the smooth being preferred. Smooth moulds are those most suitable for covering with chocolate. Let these creams or centres solidify in the starch-trays, like creams. These centres, like creams, must not be made long before they are covered. They harden quickly and do not soften when covered. In a well-arranged factory, there should always be a reserve kept of hard bon-bons, such as hard nougats, roasted pralines, etc., in case of damage to the machinery or any delay in the preparation of creams, in order not to stop the women who are engaged in the covering either by hand or by machinery.

### MARRONS CREAMS.

Chestnuts, 1 lb.	Fresh Butter, 1 lb.
Sugar, 1 lb.	Maraschino, to flavour.

Skin and roast the chestnuts, and pound them to a fine pulp in a mortar. Add the sugar, and mix thoroughly. Work in the butter and a few drops of maraschino. Pipe out from a bag long lines of the paste on to stiff glazed paper, and allow to set in a cool place. Dip in good couverture, and decorate with gold-leaf.

### RUSSIAN CHOCOLATE BON-BONS.

Fresh Butter, 1 lb.	Roasted Almond-grains, 1 lb.
Coffee Syrup, $\frac{1}{2}$ lb.	

Cream the butter by working it with a spatula in a basin. Add to this, little by little, the coffee syrup, working the paste well in order to make it light. When all the syrup has been taken up, put this dough into a press fitted with a small oval die. Deposit upon paper in pieces of the size of an olive, and put aside to cool. When the dough is hardened, roll the bon-bons between the hands and then in the granulated almonds (see Grains for Pralinés). Cover them with superfine chocolate coating. These bon-bons are very good, but do not keep long.

# THE MANUFACTURE OF CONFECTIONERY

## COATED BON-BONS WITH ALMOND-PASTE INTERIOR.

Blanched Almonds, 3 lb.	Sugar, 6 lb.
Rum, 1 lb.	Glucose, 8 oz.

Treat in the same manner as for nut-paste. Roll out by hand, and cut with hand-cutter in the form of elongated almonds. Coat with rum fondant of pale green colour.

## COATED BON-BONS WITH PISTACHIO INTERIOR.

Blanched Almonds, $2\frac{1}{2}$ lb.	Glucose, 8 oz.
Blanched Pistachio Nuts, 8 oz.	Vanilline Sugar, to flavour.
Sugar, 6 lb.	

Proceed as above. Coat with chocolate fondant.

Similar centres with almond-paste, flavoured with tea, pineapple or fruit can be prepared in the same way as the above recipes. The coatings can be of white vanilla fondant, pale yellow Kirsch fondant, or fondant with any other flavour to blend suitably with the interior.

## ORDINARY ALMOND-PASTE FOR MACHINE WORK.

Almond-powder, 10 lb.	Crystallised Sugar, 45 lb.
Fondant, with 25 per cent. Glucose, 25 lb.	Glucose, 5 lb.

Proceed exactly as for fine Almond-paste. With this paste, all fancy shapes may be made in the Ball Machine. These machines are too well known to require description here. Make small and large cigars, which may be dried in starch and then wrapped in wafer paper the colour of tobacco ; potatoes, covered with cocoa powder and then crystallised ; carrots, the green of which is imitated by two pieces of preserved angelica, and then crystallised ; mushrooms, the tops of which are dusted with cocoa powder ; green and brown acorns, the cups of which are made of granulated chocolate ; coloured and crystallised pears, etc.

## COCOANUT-PASTE, JAP NUGGETS.

White Sugar, 10 lb.	Fresh Cocoanut, 10 lb.
Glucose, 10 lb.	Flour, $\frac{1}{2}$ lb.

Boil the sugar and the glucose to "ball point" in a small Steam-pan. Turn off the steam ; mix in with the spatula the cocoanut, chopped

## SUGAR GLAZE, VANILLINE SUGAR, ETC.

very fine, and also the flour. Do not work this paste, but simply mix it, and pour out upon a marble slab dusted with starch powder. Roll out in sheets while still warm, using starch powder for dusting. When the paste has been brought down to a sheet of the thickness of soft caramel (see illustrations of Caramel Rolling and Gauging Machine), let it harden till the following day, and then cut in the Jap Cutting Machine into squares and lozenges. They are made in all colours, and variegated. This paste does not candy, and has the advantage of keeping for a very long time. Pastes may be made in the same proportions and in the same way with all oily fruits : nuts, filberts, almonds, pine-kernels, beech-nuts, etc.

(b)

### BON-BON VARNISH FOR DECORATION.

Resin, $9\frac{1}{4}$ oz.	Alcohol at $96^{\circ}$ F., 4 lb.
Sandarach Gum, $6\frac{1}{2}$ oz.	

Grind the two gums together, and pass through a hair sieve. Put the whole, with alcohol, in a glass bowl, in the drying-room, and stir from time to time with a spatula ; when all is dissolved, pass through filtering-paper.

### BENZOIN GUM FOR CHOCOLATE.

Powdered Benzoin Gum, 2 lb.	Alcohol at $96^{\circ}$ F., 5 lb.
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Put the powdered gum in a glass or earthenware vessel, put in the alcohol, and mix with spatula, stirring from time to time, keeping the vessel closed. When the gum is well dissolved, pass through filtering-paper, and use in that condition.

### GLAZE AND NOUGATINE GLAZING.

Albumen, $2\frac{1}{2}$ oz.	Icing Sugar, $2\frac{1}{2}$ lb.
Coffee Essence, 1 lb.	

Dissolve the albumen, cold, in the coffee essence, and, when it is well dissolved, pass through a fine sieve, and work with a spatula into the powdered sugar in order to obtain a soft, light glaze.

Into this glaze, dip the nougatines to half their depth by means of a round wire dip, and place upon paper, and the paper upon sheets of tin. When one sheet is glazed, it must at once be put into the

## THE MANUFACTURE OF CONFECTIONERY

drying-room in order that the nougatines may dry quickly and preserve their brilliancy. The day following, glaze the other side. These bon-bons are very good, and keep for a long time. The work may be done by young girls. After some days' experience, they can glaze from 25 to 35 lb. per day each.

### RECIPE FOR WATER-GLAZING.

Take the same gelatine basis as for glacé royale, and add to it 1½ lb. of icing sugar to the pound of gelatine mixture, in order to obtain a glazing like that above for nougatine. Glaze as above, flavouring and colouring the glaze according to the interior.

### VANILLINE SUGAR.

One ounce of vanilline crystals. Mix till dissolved in 4 oz. of alcohol at 96° F. (35.5° C.). When the solution is made, put it into a perfectly clean basin, and rub into it 13 lb. of powdered sugar. Let it dry for one night in the air, put it into bottles, and use for all purposes.

### LIQUID VANILLINE.

Put 1 oz. of vanilline into 2½ lb. of alcohol at 96° F. ; stir to dissolve, and make use of it in that condition.

### COFFEE ESSENCE.

Two pounds of roasted and ground coffee, of good quality, infused in three quarts of boiling water. After two hours' infusion in a closed vessel, filter in order to obtain a perfectly clear essence. This essence may serve for all purposes.

### ORANGE AND LEMON PEELS (FLAVOURS).

As it is difficult and expensive to get fresh oranges and lemons in summer and autumn, it is advantageous to make provision in January or February, when these fruits are at their best and can be obtained cheaply, for no essence can be compared to the fruit itself in delicacy of flavour.

Rasp the peel of the fruit very lightly upon loaf-sugar. With a large knife, shave off the sugar as far as it is impregnated with the

## EXTRACTS AND INFUSIONS

essential oil of the fruit. Put this sugar into small bottles, dry and clean, packing it in well with a piece of wood. Close the bottles hermetically, and put them in a cool cellar. Fruit-peel thus prepared will keep in very good condition for a year or more.

### ORANGE AND LEMON JUICE.

In order not to lose the juice of the oranges and lemons, they may be very advantageously used when preserved as follows: Extract the juices separately by means of a wooden pestle, upon which the halves of the fruits are pressed, the juice passing through a sieve into a basin below, thus separating the seeds and the pulp, and leaving only clear juice. Mix this juice with powdered sugar to a fairly thick paste, adding 10 per cent. of glycerine. Put these pastes into glucose casks sawn in half, and stand them aside in a cool place, well covered. Take out these pastes as they are wanted for such goods as fancy bon-bons moulded from almond-paste, acid pastilles, interiors, or orange and lemon bon-bons, etc. Of course these pastes cannot be employed just as they are. Flavours, citric acid, or others, must be added according to the class of bon-bons to be made.

### ORANGES AND LEMONS INFUSED IN ALCOHOL.

Take five oranges or lemons with rough skins and good flavour, and remove the thin outer portion of the skin. Put these skins into jars, cover with alcohol at 96° F., and let steep for 30 days, in hermetically sealed vessels. Afterwards pour off, filter and bottle. If no still is at hand, simply put the skins into a press in order to extract the remaining alcohol. This makes a good flavour for all kinds of hard and soft goods.

### INFUSION OF BLACK-CURRANT BLOSSOMS.

Take fresh black-currant blossoms, and infuse them in alcohol for 30 days in the same way as for the orange and lemon peel above. This flavour is excellent, especially for acidulated boiled sugars. Excellent flavours are obtained by the very simple method of infusing all kinds of fruits in good quality alcohol and then submitting them to pressure. Flavours thus obtained are better than essences, though often difficult to use if too dilute in strength, owing to the large quantity of flavouring liquid that has to be added.

# THE MANUFACTURE OF CONFECTIONERY

## DISTILLED ORANGE AND LEMON WATERS.

After having peeled the lemons or oranges, crush them with coarse crystal salt in a mortar. Put the whole into the still with water, and distil gently. In this way the water distilled is excellent, though dilute.

## COLD SUGARING OF DISTILLED WATERS.

Powdered Sugar, 40 lb. Perfumed Distilled Water, 40 lb.

Put the whole into a clean pan, stir with spatula in order to dissolve the sugar, pass through a fine sieve. Put into bottles and seal well, and then store in a cool place. Distilled waters, prepared in this way, will keep for a very long time.

## DISTILLED RASPBERRY WATER.

Fresh Cleaned Raspberries, 100 lb. Water, 10 lb.

Distil gently, and draw off only 10 lb. of water of distillation. Sugar as above.

## INFUSION OF IRIS IN ALCOHOL.

Infuse perfectly white and fresh Florentine iris (orris root) for 30 days in alcohol at 96° F.

## TEA EXTRACT.

One pound of good tea infused for two hours beforehand in a close vessel with 10 lb. of boiling water. Distil gently, and withdraw only 5 lb. of the liquid. Sugar as above. All fruit extracts can be made in the above manner.

## VANILLINE SYRUP (FOR DRAGÉES).

Vanilline in Crystals,  $\frac{1}{15}$  lb. Alcohol at 96° F.,  $\frac{2}{5}$  lb.  
Loaf-sugar, 20 lb.

Dissolve the crystal vanilline in the alcohol, stirring from time to time. Reduce the sugar to a syrup at 30° Baumé. When it is cold, add the above solution. Bottle and cork. Use for all purposes of manufacture.

## COLOURS

### PREPARATION OF COLOURING FOR DECORATING BON-BONS, DRY.

Take dry powdered starch, colour to the desired tint with the following liquid : Fine white gum, well dissolved and strongly coloured. Put this coloured gum into a certain quantity of powdered starch, and mix the mixture well. For applying the colour, use a piece of wadding, moistening same in steam, and dipping lightly into the coloured powder. Rub slightly the top or parts of the bon-bon to be coloured. Prepare in the same way all colours and tints. Keep these powders in separate closed tins.

### PREPARATION OF COLOURS FOR BON-BON DECORATION, WITH BRUSH.

Prepare the same liquid as above, and make a rather fluid paste with three parts of powdered starch and one part of powdered sugar, which is then mixed upon pieces of glass, where it is left to dry. Each piece of glass should have a different coloured paste. When perfectly dry, use as follows : Slightly moisten a small brush, and apply to the dry colour and, when it is slightly coloured, apply carefully to the part or parts of the bon-bons to be decorated, or in making the veins of foliage.

### JAPANESE JELLY (JAPANESE SEA-WEED).

Japanese jelly is a valuable aid in confectionery-manufacture. Boiling reduces its strength, and, as it dissolves only with thirty-two times its weight of water, it is not always easy to use it in that condition. The following is a method of treating it so that it may be utilised, while still preserving all its properties. Weigh it, and steep in cold water for twelve hours. Then melt in a "Bain-marie" with thirty-two times its weight of water, and, when it has been passed through a sieve, return to the "Bain-marie" to evaporate the excess of water. At this point, put a certain quantity aside for future use, and add 5 per cent. of glycerine to prevent its spoiling. To the remaining portion, add 20 per cent. of white, odourless vaseline oil. This done, evaporate in the "Bain-marie" till all the water has been removed, which is easy to verify by weighing. With this oily substance, well saturated with Japanese jelly, drop-roller goods may be slightly

## THE MANUFACTURE OF CONFECTIONERY

coated in a Comfit Revolving Pan. We have often performed this operation, and always with success. All goods which become sticky on contact with the air may be treated in this way. Their transparency in no way suffers, and their preservation is very much prolonged.

### LIQUID COLOURS.

Liquid colours should all be prepared in the following manner:  $1\frac{1}{4}$  oz. of powdered colour (usually aniline) should be dissolved with the smallest possible quantity of water or alcohol. Mix this solution into a pound of glucose, put the whole into a "Bain-marie," and evaporate the liquid down to a very thick paste. Colours, thus prepared, have these advantages, that they mix readily with boiled sugar, and very little is needed to colour a large portion of dough or syrup. These colours are put into tin boxes, with a small stick in each.

A well-equipped workshop should use up its scraps for dark-coloured goods, such as "coffee," "chocolate," "liquorice," and other similar colours. We specially recommend that no scraps should be put into any class of hard-boiled goods. These scraps, in many workshops, are put into the next batch. This is a grave error. It would be much better to boil them over again. Used without reboiling, they melt only imperfectly, and, consequently, leave grains in the paste, spoiling the goods completely within a short time. If they cannot be regularly used for dark-coloured bon-bons, they should be put on one side to make stick-candy, as is the custom with certain houses, with excellent results. In case of insufficient sale for sugar-sticks, the siftings and broken pieces of drop-goods could always be used for sweetening low-priced jams and marmalades.

### PROCESS FOR NEUTRALISING THE ACID IN THE SIFTINGS AND BROKEN PIECES OF DROP-GOODS.

Melt this scrap down to  $30^{\circ}$  Baumé, filter hot through a layer of animal charcoal, or Norit, and return to boil, adding an emulsion of white of eggs, beaten in a little cold water. When the syrup rises, shut off the steam for about an hour in order to allow the scum to come to the surface. Remove the scum with care, turn on the steam again, and bring to  $32^{\circ}$  Baumé. Shut off the steam, and add some handful

## SYRUPS

of Spanish whiting. Let stand to cool. The Spanish whiting falls to the bottom of the pan, taking all impurities with it. Filter off, and put this syrup into pans. It should be quite clear, and will boil well in the Vacuum Pan to "hard crack," without the addition of any new syrup.

### METHOD FOR PRESERVING ALMONDS, FILBERTS, PISTACHE, ETC.

Make a solution of 5 per cent. boracic acid and 95 per cent. warm water. Dip the almonds, etc., into this solution, and then dry thoroughly in a drying-room at 95° F. (35° C.). They will thus keep for years without being attacked by worms.

For fear the meat of the nuts should blacken, add to the solution 1 per cent. of powdered alum.

### SUPERFINE ORGEAT SYRUP.

Sweet Majorca Almonds, 15 lb.	Sugar, 100 lb.
Bitter Almonds, 5 lb.	Orange-flower Water, 1½ lb.
Water, 100 lb.	Gum Tragacanth, 1¾ oz.

Scald the almonds for some minutes in boiling water, stirring them constantly. As soon as the skins become easily removable, they are taken from the boiling water and plunged suddenly into cold water which is constantly renewed. In order to remove the skin, the Almond Blanching Machine is used.

### GRINDING.

Dissolve the gum tragacanth in 100 lb. of water, and put the almonds, still moist, into the hopper of the Orgeat Mill. This mill consists of two small horizontal stones running one above the other, as in the Cocoa Mill. The blanched almonds are put into the hopper, from which they pass, by the funnel in the centre, to the stones, where they are reduced to a fine, liquid paste. A cask, fitted with a tap at the bottom, is placed by the side of the Orgeat Mill, arranged in such a manner as to deliver into the centre of the revolving stones. This cask contains the 100 lb. of water in which the gum has been dissolved. Let all the water pass through gradually with the almonds. The almond-milk, or paste, coming out from the mill, is received in porcelain basins. The almond-milk is poured into a strong canvas

## THE MANUFACTURE OF CONFECTIONERY

bag, and put under a Press for the extraction of all of the liquid. The broken sugar is put into a Steam-boiling Pan, and the almond-milk poured over it, after having been passed through a fine sieve. The heat is now gently and gradually raised to  $140^{\circ}$  F. ( $60^{\circ}$  C.), stirring constantly with spatula. The orange-flower water is added, and the syrup filtered while still hot. It is then put into earthenware basins, or into a well-tinned pan. Bottle while still warm, but cork only when quite cold.

### FINE ORGEAT SYRUP.

Sweet Almonds, 6 lb.	Water, 110 lb.
Bitter Almonds, 6 lb.	Orange-flower Water, 1 lb.
Sugar, 120 lb.	Gum Tragacanth, $1\frac{3}{5}$ oz.

Proceed as above.

### ORGEAT SYRUP WITH GLUCOSE

Sweet Almonds, 6 lb.	Glucose, 50 lb.
Bitter Almonds, 6 lb.	Water, 36 lb.
Sugar, 50 lb.	Orange-flower Water, $\frac{1}{2}$ lb.

Proceed as above, except that the glucose should be warm and dissolved in the water which is to liquefy the ground almonds. In this way the syrup will be well mixed.

### FINE GUM SYRUP.

White Gum Arabic, 10 lb.	Orange-flower Water, 2 lb.
Loaf-sugar, 100 lb.	Albumen, $1\frac{3}{5}$ oz.
Water, 60 lb.	

Wash the gum and dissolve in its own weight of cold water. Strain through linen, and pour over the sugar. After having been thoroughly beaten and mixed with the albumen, add remainder of water, and boil gently to  $32^{\circ}$  Baumé, taking off the scum. Filter, perfume with orange-flower water, and, while still warm, put into bottles, and cork when cold.

### GUM SYRUP WITH GLUCOSE.

Light Yellow Gum, 10 lb.	Water, 36 lb.
Sugar, 50 lb.	Albumen, $1\frac{3}{5}$ oz.
Glucose, 50 lb.	

Proceed as above.

## SYRUPS

### FINE RED-CURRANT SYRUP.

Preserved Red-currant Juice, 50 lb.      Sugar, 100 lb.

The juice is poured out into a Steam-pan upon sugar broken into small pieces. As soon as the syrup begins to boil, it should be allowed to stand for a moment. Then the scum is taken off, and the syrup passed through a sieve. The syrup becomes quite clear of itself. It ought to have a density of  $32^{\circ}$  Baumé. If necessary, it is coloured with carmine before filtering.

### RED-CURRANT SYRUP, WITH GLUCOSE.

Crystallised Sugar, 50 lb.      Raspberry Vinegar, 1 lb.

Glucose, 50 lb.      Water, 26 lb.

Preserved Red-currant Juice, 10 lb.      Tartaric Acid,  $6\frac{1}{2}$  oz.

Proceed as above.

### RASPBERRY SYRUPS.

Raspberry syrups are made in the same way as the red-currant syrups described above.

### SUPERIOR POMEGRANATE SYRUP.

Sugar, 100 lb.      Pomegranate Juice, 50 lb.

Choose acid and ripe pomegranates. Extract the juice, and put it with the sugar in a Steam-pan. Boil to  $32^{\circ}$  Baumé.

### COMMERCIAL POMEGRANATE SYRUP.

Crystallised Sugar, 100 lb.      Tartaric Acid, 4 oz.

Water, 55 lb.      Citric Acid,  $3\frac{1}{5}$  oz.

Cochineal,  $6\frac{1}{2}$  oz.      Vanilline Sugar,  $\frac{1}{2}$  lb.

The sugar is reduced to syrup in 45 lb. of water. To this the cochineal infusion, made with the ten remaining pounds of water, together with the citric and tartaric acid, is added. The whole is then boiled to  $32^{\circ}$  Baumé. Vanilline sugar is added, and the liquid is then filtered. Bottle as with the other syrups.

# THE MANUFACTURE OF CONFECTIONERY

## EXTRACT FOR POMEGRANATE SYRUP.

Carmine, $\frac{1}{4}$ oz.	Citric Acid, 13 oz.
Ammoniacal Cochineal, $\frac{1}{8}$ oz.	Distilled Water, 3 lb.

The carmine is dissolved in the water ; to this the ammoniacal cochineal is added, and the whole boiled till the solution is complete. Add the citric acid, then mix the whole into 100 lb. of plain syrup at  $32^{\circ}$  Baumé, boiling ; this is brought back to the same degree by means of boiling.

## SYRUP SUBSTITUTE.

25 lb. Glucose, boiled down to  $32^{\circ}$  Baumé, to which add  $\frac{1}{16}$  oz. of Saccharine.

In order that the syrups may be preserved in good condition, we recommend that they be put into the Processing Retort at a temperature of  $172^{\circ}$  F. ( $79\frac{1}{2}$  C.), and the corks sealed with wax before bringing them out into the cool atmosphere. This method is not expensive, and will prevent the fermentation which often takes place in syrups.

(c)

## GLACÉ ROYALE, OR ICING SUGAR, FOR PIPING.

Strong Gelatine, 8 oz.	Water, 10 lb.
Alum, 4 oz.	

Steep the gelatine for twelve hours beforehand in the 10 lb. of water, then add the alum, and warm in order to dissolve same, but without boiling, preferably in a "Bain-marie." Pass through a fine sieve, and put in uncorked bottles. Use this liquid for making glacé royale, or icing sugar, with very fine and very white pulverised sugar. The paste should be light and of much body. Decoration is the artistic side of confectionery ; some workmen, who have devoted themselves specially to it, imitate to perfection all manner of subjects. Unfortunately these artists are becoming rarer every day.

## FONDANT FOR COVERING BON-BONS.

White Sugar, 10 lb.	Water, 6 lb.
---------------------	--------------

The sugar should be completely dissolved in the water before being brought to the boil. When dissolved, boil as rapidly as possible,

## COATING BON-BONS WITH FONDANT

sponging well the side of the pan. Boil to "soft ball," and pour out upon a clean, moistened, cold slab. Sprinkle the top of the syrup with some drops of water, and only beat when lukewarm.

For coffee fondant-covering, the coffee flavouring should be added at the last possible moment, though the flavour may be preserved, if the fondant is made on a low-pressure Vacuum Pan, the syrup having been flavoured before cooking.

When flavoured with chocolate, the unsweetened chocolate, flavoured with vanilline sugar, should be added and well mixed in with the boiled syrup just previous to placing in on the cold slab.

### THE PROCESS OF COATING BON-BONS WITH FONDANT.

For this work a small gas stove fitted with a "Bain-marie" should be used. The fondant should be heated and stirred without being beaten, and the gas should be lowered the moment the fondant has reached the right point. The temperature of paste should be a little higher than for casting or depositing. Hand-dipping is a work which requires to be very skilfully done in order to have bon-bons of the same shade and density. The fondant should be very white, and sufficiently boiled in order to be able to add flavour and colour. It ought to be well worked, so as to have good body, and allow of a curl or other design to be made in the process of coating the bon-bon. For fondant-coating, some manufacturers employ 10 and even 15 per cent. of glucose. Some drops of acid, when the syrup begins to boil, will give a better result. For the more ordinary class of coated bon-bons, take the fondant, prepared in the Mechanical Beater, because it has body, and the designs on the bon-bons stand out clearly marked.

When several workers are required for this work, it is preferable to have a long iron table with a "Bain-marie" along the edge, heated to 176° F. (80° C.). This "Bain-marie" should be covered with a sheet of iron with several round holes to allow of placing the small pans on them. An experienced worker can cover  $\frac{1}{2}$  cwt. a day.

# THE MANUFACTURE OF CONFECTIONERY

## Chapter VI.

*Covering-Chocolate—Its Preparation and Application.*

### PREPARATION OF COVERING-CHOCOLATE.

**I**N the first edition of the book, over 80 different recipes for chocolate were given ; we could increase this number to 800 without any difficulty. No good purpose, however, can be served by perpetuating or accentuating such waste of good book space.\*

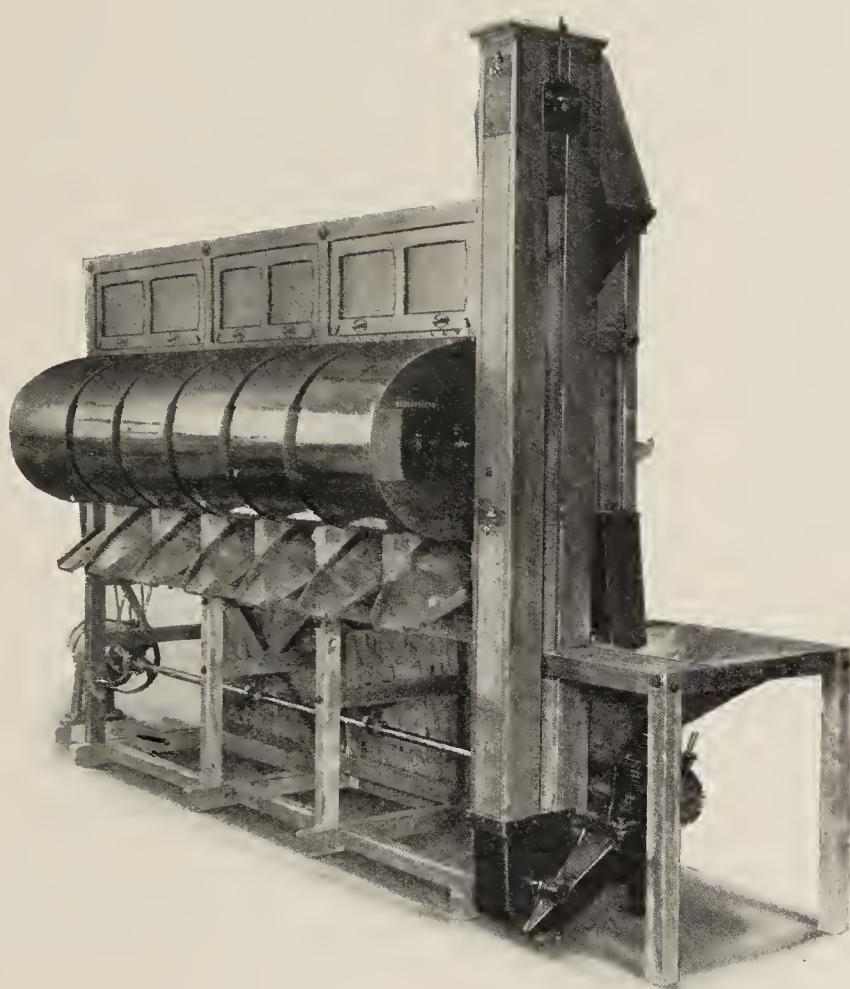
In the preparation of covering-chocolate, it is often overlooked that good couverture can only be obtained when good cacao beans are used. Often enough, the couverture for sale on the market to the small confectioner is chocolate of inferior quality, containing a low grade of bean, much husk and, sometimes, a considerable amount of starch. Such adulteration or contamination can readily be detected and altogether spoils the aroma of the covering which should be as fine as possible to set off the delicacy of well-prepared centres. For cheap chocolate bon-bons the quality of the couverture or covering is less important, though under no circumstances can the preparation or use of an inferior couverture be advocated.

Firstly comes the question of the selection of the cacao bean, and, without going into reasons "why" in this place, the following combinations will give excellent results, from which must be selected by the manufacturer those that suit his palate and his purse.

Grenada, 3 ; Bahia, 1 ; Ceylon, 1 ; Para, 1.

Grenada, 3 ; Maranhao, 1 ; Guayaquil, 1.

\* If further information on the manufacture of chocolate of all kinds be required, *Cocoa and Chocolate : Their Chemistry and Manufacture* (J. and A. Churchill), a work by the present reviser, is recommended. This book contains the most complete and up-to-date information on the chocolate industry, and should be consulted in all questions relating to the chemistry and preparation of chocolate and its ingredients.



STANDARD COCOA NIBBING, HUSKING  
AND WINNOWING MACHINE  
FAN SEPARATOR TYPE WITH ELEVATOR

## THE MANUFACTURE OF CONFECTIONERY

Equal parts of Trinidad, Para.

Equal parts of Trinidad, Maranhao, Guayaquil and Para.

Equal parts of Trinidad and Caracas.

Equal parts of Samana and Santa Lucia.

Equal parts of West African and Trinidad.

Such combinations can be multiplied endlessly, but further examples can serve no useful purpose, as so much depends upon the individual likes and dislikes of the manufacturer and upon his conception of legitimate profits to be made out of the covering on his bon-bons.

So far as the smoothness of couverture is concerned, it is clear that it need not be reduced to that of the finest plain eating-chocolate, since, almost invariably, the centres are, to some extent, hard or gritty. Nevertheless, such an admission does not allow us to advocate the use of husk, or germ.

The operations through which the cacao beans pass in the process of manufacture of couverture are :—

1. Cleaning the cacao beans.
2. Sorting and grading the cacao beans.
3. Roasting.
4. Nibbing and husking the roasted beans (see illustration).
5. Milling the cacao nibs to cacao mass (often called cocoa-bitter or bitter chocolate). A 2-stone Mill is illustrated.
6. Mixing cacao mass with sugar, extra cacao butter (cocoa butter) and flavouring to make chocolate mass. A No. 7 Melangeur and the latest Vacuum Mixer are shown in the illustrations.
7. Refining the crude chocolate mass. A 5-roll Refiner is shown among the illustrations.
8. Further refining, heating, conching, etc., as desired. The latest design of a Conche is illustrated.



TWO-STONE  
COCOA MILL

## THE MANUFACTURE OF CONFECTIONERY

### UNIVERSAL PATENT VACUUM MACHINE FOR CHOCOLATE.

An interesting innovation in the chocolate factory is the Vacuum Mixing Machine. This machine is being adopted very rapidly in all Continental chocolate factories, where the greatest advantage has been obtained from its use.

The machine is used in various departments of chocolate manufacture :—

1. In the manufacture of ordinary chocolate containing a high percentage of sugar, the mass is softened much more quickly in this machine than by any other process.

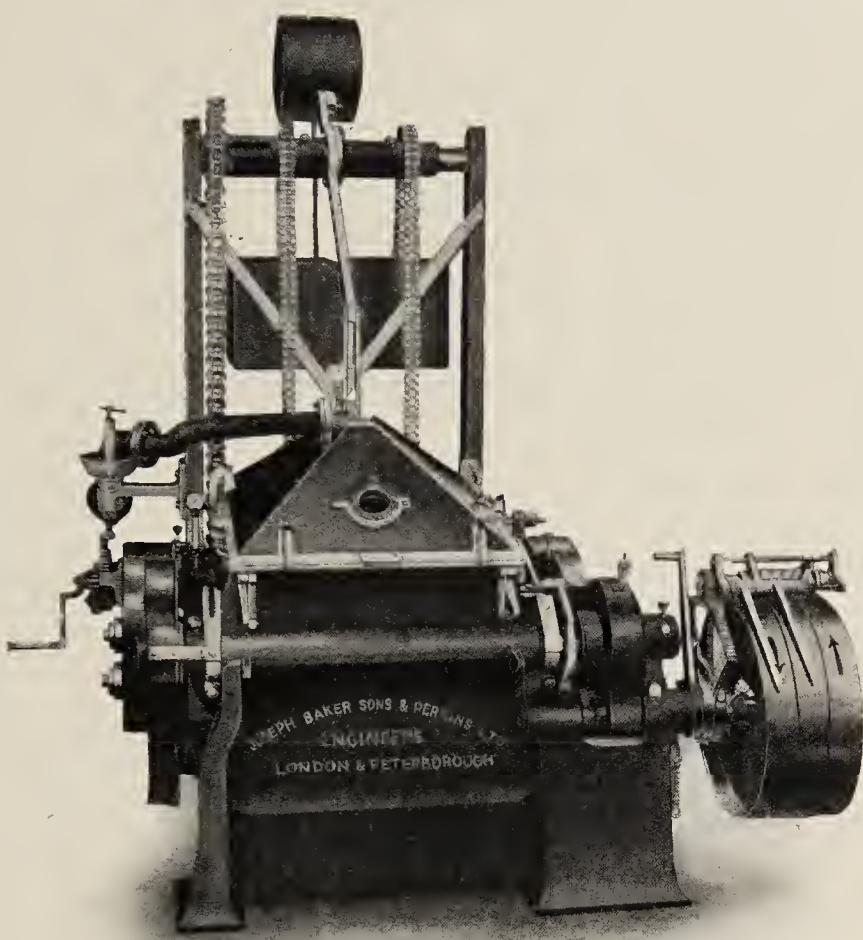
2. In making medium quality chocolate, it is considered that a certain saving of cocoa butter is effected by the rapid amalgamation of the ingredients.

3. In high-grade fondant chocolate and coatings, the use of the Vacuum Mixer reduces conching time by 25 to 30 per cent.

4. In the manufacture of cocoa powder by the alkali process, the Vacuum Mixer will do one ton in one and a half hours, whereas the ordinary heated Mixer takes six hours.

5. In the above sections of manufacture it will be found that, where a low roasting process is used, the Vacuum Mixer will remove very rapidly and efficiently the acids and moisture remaining in the nibs. Treatment of this kind, given to a low roast mixture for an hour, will reduce the conching time by over 30 per cent. It is astonishing to see, and particularly to smell, the liquid coming off the waste pipe after treatment with the machine.

6. In the manufacture of cocoa powder, rapid and efficient methods of heating and cooling the powder are essential for obtaining the best colour. In this section of the factory the Mixer is used without the vacuum being coupled up, but its heating and cooling arrangements are so good that a colour is given to the powder which it is impossible to obtain in any other manner.



CHOCOLATE  
VACUUM MIXER

## THE MANUFACTURE OF CONFECTIONERY

7. In making milk chocolate, milk can be condensed in the machine, or milk powder, cocoa liquor, sugar, etc., mixed in the vacuum, and the chocolate is finished ready for conching.

A good covering-chocolate is made from approximately the following quantities :—

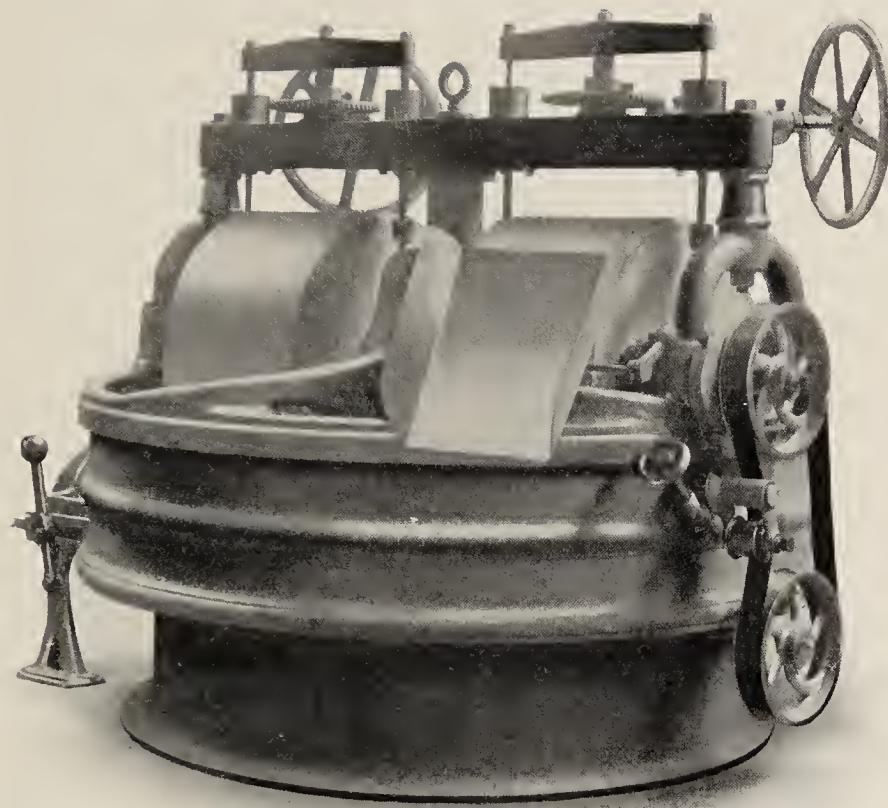
Cacao mass (or bitter chocolate) .. ..	30 parts
Sugar .. .. .. ..	49 "
Vanilline sugar .. .. .. ..	1 part
Cacao butter .. .. .. ..	20 parts
	—
	100 parts

The use of more cacao mass in such a mixing would reduce the proportion of cacao butter that would have to be added to obtain the required consistency.

We have already emphasized the necessity of selecting good beans for the preparation of the cacao mass. The sugar should be of such quality that : (a) a suitable flavour results ; (b) refining on Chocolate Refiner can be reduced to a minimum. To secure these ends "transformed" sugar (see page 30) is especially suitable, a fine sweetness, a minimum amount of refining and a considerable saving in cacao butter being assured by its use. The cacao butter is the ordinary "cocoa butter" of commerce ; cocoanut fat and other vegetable fats are sometimes used as cheapening substitutes.

Many smaller confectioners cannot afford the purchase of a complete chocolate-making plant. In such cases the Bausman Disc Machine (see *Cocoa and Chocolate : Their Chemistry and Manufacture*, by Whymper, page 28, 2nd edition) may be found useful. More often, however, the small confectioner will purchase covering-chocolate on the open market, and he must learn to discriminate between good and bad chocolates from the points of view of flavour, adulteration with husk, starch, etc.

The subsequent operation, namely the covering of bon-



No. 7 MELANGEUR WITH  
AUTO-DISCHARGE

## THE MANUFACTURE OF CONFECTIONERY

bons with the chocolate, can be done by hand or by machine, and would involve the use of the following apparatus :—

Melting-pan (for hand-work), or Kettles (for machine-covering).

A Tempering Machine (see illustration).

Covering-tables (for hand-work).

Dipping-forks (for hand-work).

Glazed papers or plaques.

Dipping-machines or Enrobers (for machine-covering).

The latest design of Enrober is illustrated.

Cool room or chamber for setting the chocolate.

Drop-press, for drop chocolates.

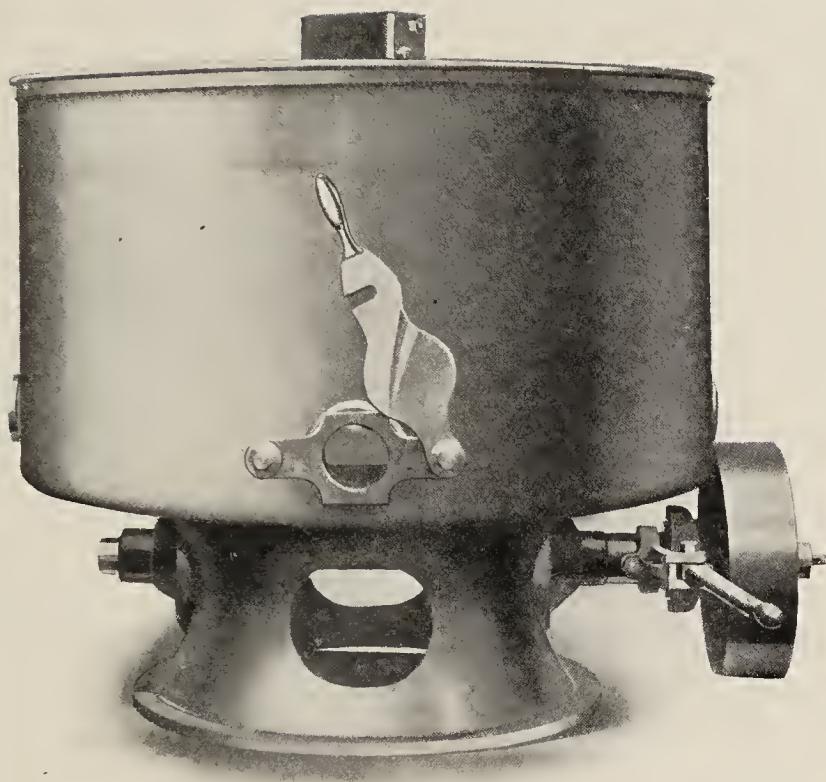
Moulds for fancy, straight or solid chocolate shapes.

Mould-filling Plant (see illustration).

### CHOCOLATE STEAM - KETTLE : CHOCOLATE MIXING AND KNEADING-MACHINE.

The chocolate, used for covering purposes, is usually purchased on the open market as large blocks weighing up to 60 lb. Before being used for covering fondants and other centres, the blocks have to be broken into small pieces and melted to a homogeneous liquid paste and then brought to the required temperature. The question of temperature is so important in obtaining fine finish to the covered goods that a Tempering Machine may be found desirable in larger factories. The installation of such a machine ensures uniformity of temperature of the chocolate and a certainty that "bloom" will not develop except under exceptionally bad conditions of storage.

Both Kettles and Kneading-machines should be steam-jacketted so as to allow of quick melting of the broken blocks, and the machines should be provided with beaters or stirrers to keep the mass in motion so that local overheating does not occur. Good types of both Steam Kettles and Kneaders are illustrated.



CHOCOLATE  
STEAM KETTLE

# THE MANUFACTURE OF CONFECTIONERY

## APPLICATION OF COVERING-CHOCOLATE.

### HAND-COVERING.

The operation of coating centres and bon-bons with chocolate can be performed by hand or by machine. If by hand, then the liquid chocolate at the correct temperature is placed in shallow pans that can be heated underneath with steam-pipes or other heating arrangements. The girls, usually employed in hand-covering, sit round the table and, by means of their fingers or a special fork, remove the bon-bons that have been thrown into the liquid chocolate, marking them on the top as they withdraw the goods and place them on glazed papers or plaques ready for setting or cooling.

The chocolate should be about  $31^{\circ}$  C. ( $87.8^{\circ}$  F.), and the finish of the goods, their colour and glossiness, depend very largely on the steady maintenance of this temperature.

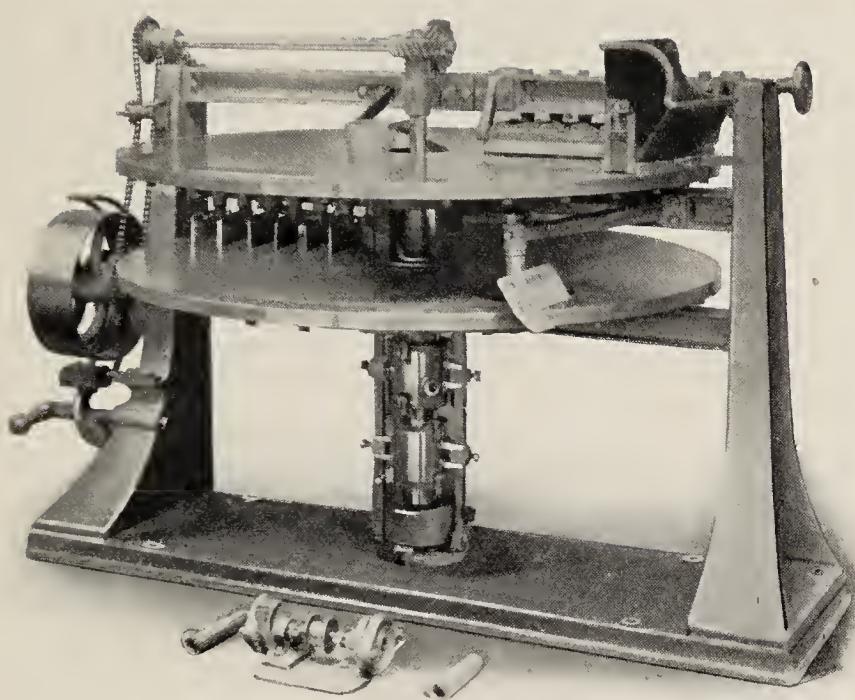
### MACHINE-COVERING.

The two best methods for covering bon-bons with chocolate are on (a) the "Champion" Coating-machine ; (b) the Enrober.

### THE "CHAMPION" COATING-MACHINE.

The "Champion" Dipper, as it is usually called, has certain advantages for covering large pieces of goods which are strong enough to be placed in the baskets and to pass through the operation of dipping and tapping.

Briefly describing the process, the goods are placed in wire baskets or trays covered with a wire screen. The trays are then placed in the machine which, at the direction of the operator, dips the basket and contents beneath the liquid chocolate contained in the well of the machine, rocks the basket to and fro, raises the basket again and, by a further



THE "BAKER"  
CHOCOLATE TEMPERING MACHINE

## THE MANUFACTURE OF CONFECTIONERY

movement on the part of the operator, taps the basket and contents so that superfluous chocolate drips off and runs back into the main well.

When sufficient tapping has been applied, a sheet of glazed paper or a tin plaque, the same size as the basket, is placed on the top and held in position by means of a light hand-board. The supporting arms holding the basket are tipped over on their axles till the basket is inverted, when the covered goods drop out on to the paper or tin, and are ready for the cooling-room.

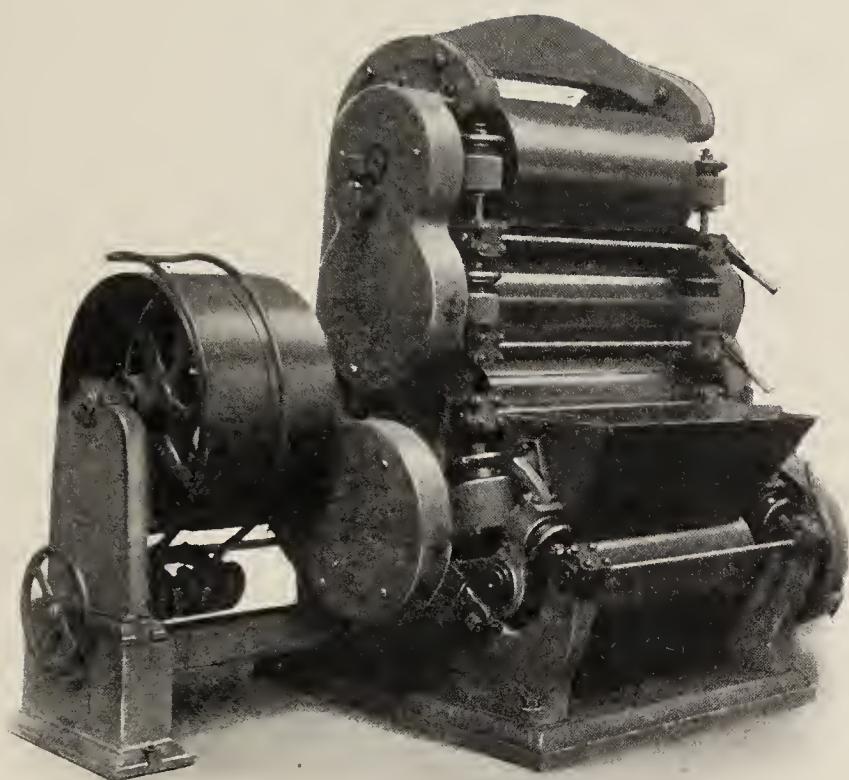
Girls fill the trays or baskets, taking the empty basket which has been slipped into the side supports of the steam-heated drip tank for the purpose. It is advisable to place the baskets, during filling, on steam-heated tables so that the chocolate does not solidify on the wires.

Any amount of goods from 10 to 20 cwt., according to the size of the pieces to be covered and to the skill of the operator, can be turned out by one of these machines per day. Three girls only are required to attend each Dipper.

### THE ENROBER.

The modern Enrober, illustrated, is the last word at the time of writing in Covering Machines. Although made up of a number of parts, the principle of the Enrober is simplicity itself. The pieces are fed into one end of the machine on a travelling canvas belt. They then pass on to a wire belt-conveyor, within the case, where they travel through a cascade of liquid chocolate. The surplus chocolate is removed from the covered pieces by an air-blast and by a slight tapping movement, and the goods, after leaving the case, pass on to plaques on another travelling web-belt, whence they can be removed to a cool room or passed continuously through a cooling-chamber attached to the machine.

Except when placed on the feeding-belt, the goods need never be touched by hand until ready for packing. Some



THE FIVE-ROLL REFINER  
WITH SPRING BEARINGS

## THE MANUFACTURE OF CONFECTIONERY

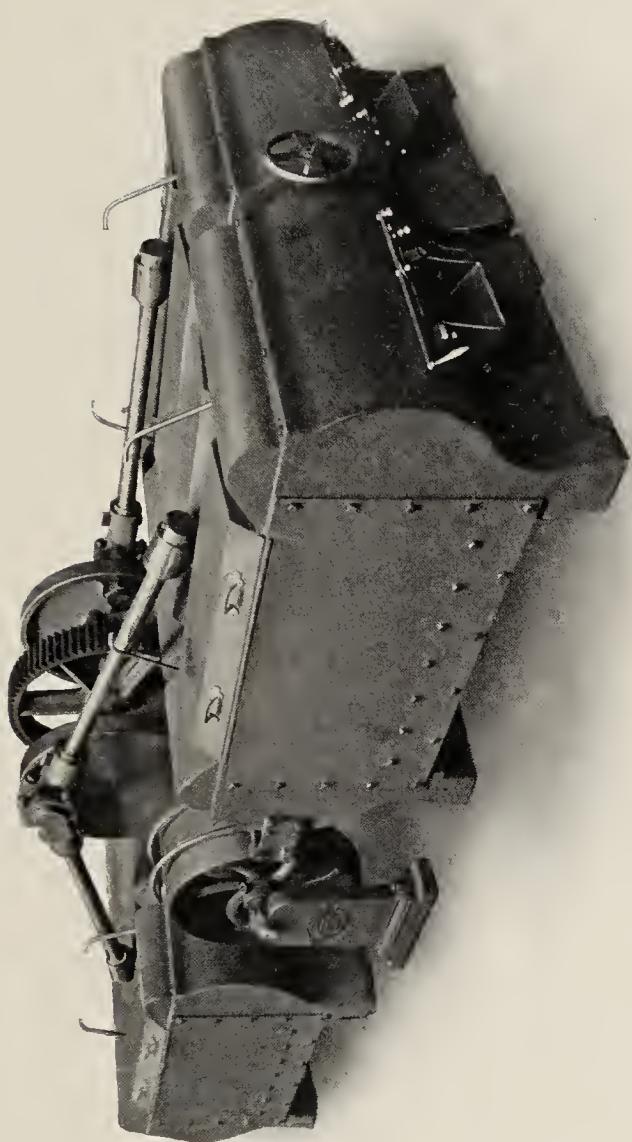
refinements such as "bottoming attachment," "automatic feeder" and the "Kihlgren" system of decorating the tops of the pieces can be supplied with the machine. More often, however, the decoration is done by the girls, sitting at the delivery end of the machine, by means of decorating forks.

### COOLING OR SETTING-ROOMS OR CHAMBERS.

There is no doubt that the gloss on chocolates is encouraged or improved by rapid cooling. On the other hand, there are dangers arising from condensation when the cold goods are taken to the warmer packing-rooms that cannot be ignored. Generally speaking, it is desirable to cool at as low a temperature as possible consistent with keeping the temperature of the cooling and packing-rooms at not too great extremes. A temperature of 8° C. (46·4° F.) is a fairly safe one for cooling if the packing-room is cool, though this temperature must be altered during the hotter months if good finish is required.

The covered goods are placed, with their plaques, on racks in a cold room, kept cool by any of the known systems of refrigeration, and should be left to set till the chocolate has become firm and assumed good colour and gloss. The less handling after that the better, as chocolate quickly loses its fine glaze and becomes white and dusty looking if the pieces are rubbed together or handled much during the packing. The best system of cooling is on a Continuous Travelling Cooler which consists of a moving web passing through a chamber maintained at the correct temperature. The goods on their plaques are fed in at one end of the cooler, and the set and finished chocolate-coated bon-bons can be taken from the further end straight to the packing-room ready for placing in boxes, etc. A Continuous Cooler is, with advantage, attached to all Enrobers and other continuous machines for covering bon-bons.

*Note.*—It is important that the goods to be covered should be cooled to a temperature not higher than that of the covering-chocolate, if bloom is to be avoided.



NEW DESIGN FOUR-POT CONCHE MACHINE

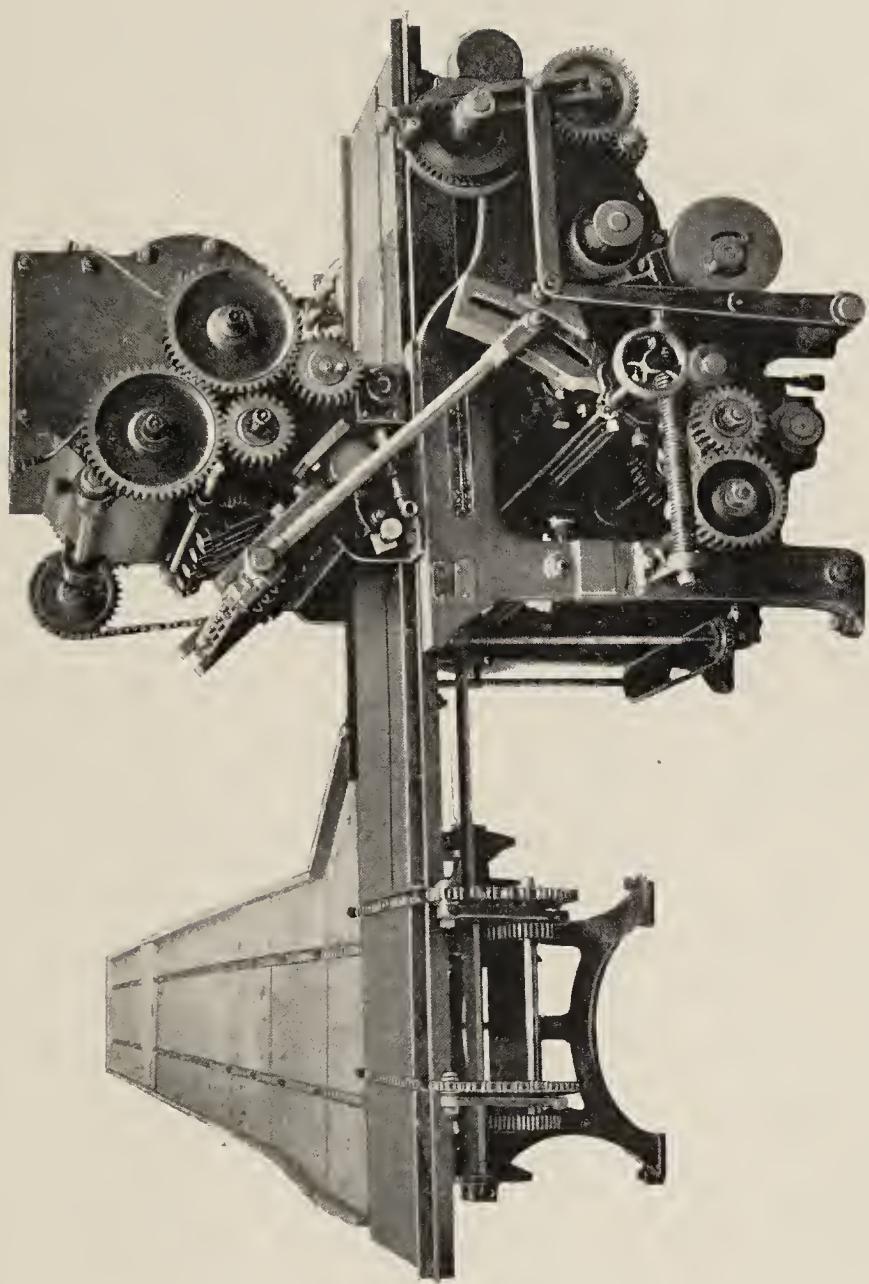
## THE MANUFACTURE OF CONFECTIONERY

### THE DROP-PRESS.

This simple machine is one of the handiest and most necessary adjuncts to the small confectioner's chocolate-room. With suitable moulds, neapolitans, croquettes, alphabets, animals and any number of fancy shapes of plain, or milk, solid chocolate can be made. Such solid pieces, when added to an assortment of fancy, filled and chocolate-coated bon-bons, add an appearance of distinction. It is needless to add that everything depends upon the finish of the goods, the colour and glaze of the chocolate, which can be obtained only with care and when every attention has been paid to the all-important question of the temperature of moulding.

The machine consists in the main of a square vessel into which fits a plunger worked by a screw with a hand-wheel attached. The bottom of the vessel is fitted with a removable perforated plate, the position of the holes corresponding to the impressions of the mould which is slipped in underneath. After the chocolate, warmed to the correct temperature, has been placed into the body of the machine, the plunger is lowered by the turning-wheel, and, when gentle pressure is felt on the chocolate mass, a small quantity of the paste is forced through the perforations of the bottom into the corresponding impressions of the mould.

The surplus chocolate is removed from the mould-plate by a scraper, and the chocolate-filled moulds are placed on a Tapping-table to free the chocolate paste from included air-bubbles. By so arranging the Drop-press, the chocolate can be made to deposit on to plain sheets of tin, in drops of any size, and can be caused to assume a symmetrical shape, thin and flattened, by gentle tapping. These drops can then be covered with coloured sugar, or nonpareilles and, when added to a chocolate-covered mixture, add considerably to its attractiveness.



CHOCOLATE MOULD FILLING MACHINE

# THE MANUFACTURE OF CONFECTIONERY

## COVERING OF BON-BONS WITH CHOCOLATE IN COMFIT PAN FOR CRYSTALLISING.

All bon-bons, creams, pralines, nut-centres, nuts, etc., can be covered with chocolate in a Comfit Pan. Such goods when covered are, however, dull in appearance, and must be either gummed, or crystallised in sugar-syrup as ordinary fondant creams.

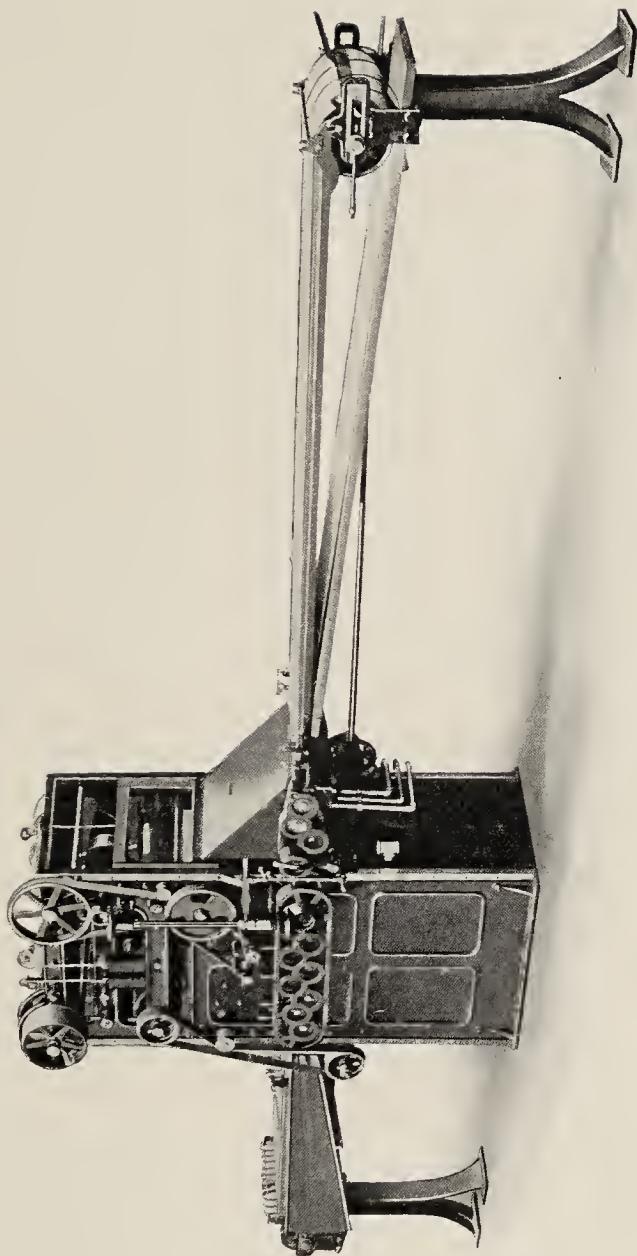
Stir the couverture in a Steam-kettle till melted to about 88° F. Put about 40 lb. of interiors to be covered into a cold Comfit Pan, with the cold water circulating through the jacket. Set going and feed the couverture in with one hand whilst stirring the interiors with the other, as in the case of dragées. When all the interiors are well moistened with the liquid chocolate, leave the machine running and carry out the same operation in another pan. The interiors will not stick if the chocolate is not poured in too quickly and if the hand is used to keep them well stirred. The goods become round or olive-shaped after several charges of chocolate, but, being dull, they require further treatment before completion. A suitable glazing material for chocolate goods prepared in this way is made as follows :—

Gum Benzoin, dissolved in alcohol	..	2 parts
Sugar	..	1 part
Cacao Butter	..	1 ,,

Add a very little more alcohol if too thick, and use slightly warm.

This glaze is added to goods as they revolve in the pan, and the treatment should be continued until the required glaze is obtained.

For crystallising, the same treatment is adopted as for other crystallised bon-bons, but care must be taken that the goods are not moved or broken from the crystallised mass until they are thoroughly dry, otherwise there is a tendency to whiten. (See also pages dealing with dragées and crystallising.)



THE ENROBER

# THE MANUFACTURE OF CONFECTIONERY

## APPENDIX I.

To convert degrees Fahrenheit into degrees Centigrade : Subtract 32, multiply the result by 5, and divide by 9.

*Example* :  $176^{\circ}$  F. =  $80^{\circ}$  C.

$$\frac{(176 - 32) \times 5}{9} = \frac{144 \times 5}{9} = \frac{720}{9} = 80$$

To convert degrees Centigrade into degrees Fahrenheit : Multiply by 9, divide by 5, and add to the result 32.

*Example* :  $70^{\circ}$  C. =  $158^{\circ}$  F.

$$\frac{70 \times 9}{5} + 32 = \frac{630}{5} + 32 = 158$$

## APPENDIX II.

### DEGREES, BRIX AND BAUMÉ, COMPARED TO SPECIFIC GRAVITIES OF SUGAR SOLUTIONS.

Brix degree. ${}^{\circ}\text{r}{}^{\circ}\text{ Bx.}$ $= 0.056^{\circ}\text{ Bé.}$	Baumé degree. ${}^{\circ}\text{r}{}^{\circ}\text{ Bé.}$ $= 0.177^{\circ}\text{ Bx.}$	Specific Gravity. ${}^{\circ}\text{ooo48}$ $= 0.1^{\circ}\text{ Bx.}$ ${}^{\circ}\text{ooo84}$ $= 0.1^{\circ}\text{ Bé.}$	Brix degree. ${}^{\circ}\text{r}{}^{\circ}\text{ Bx.}$ $= 0.054^{\circ}\text{ Bé.}$	Baumé degree. ${}^{\circ}\text{r}{}^{\circ}\text{ Bé.}$ $= 0.185^{\circ}\text{ Bx.}$	Specific Gravity. ${}^{\circ}\text{ooo64}$ $= 0.1^{\circ}\text{ Bx.}$ ${}^{\circ}\text{oo131}$ $= 0.1^{\circ}\text{ Bé.}$
10	5.7	1.0401	53	29.3	1.2495
11	6.2	1.0443	54	29.8	1.2552
12	6.8	1.0485	55	30.4	1.2608
13	7.4	1.0527	56	30.9	1.2666
14	7.9	1.0570	57	31.4	1.2723
15	8.5	1.0613	58	31.9	1.2781
16	9.0	1.0656	59	32.5	1.2842
17	9.6	1.0700	60	33.0	1.2899
18	10.1	1.0744	61	33.5	1.2958
19	10.7	1.0788	62	34.0	1.3018
20	11.3	1.0833	63	34.5	1.3078
21	11.8	1.0878	64	35.1	1.3138
22	12.4	1.0923	65	35.6	1.3199
23	13.0	1.0968	66	36.1	1.3260
24	13.5	1.1014	67	36.6	1.3322
25	14.1	1.1061	68	37.1	1.3384
26	14.6	1.1107	69	37.6	1.3446
27	15.2	1.1154	70	38.1	1.3509
28	15.7	1.1201	71	38.6	1.3572
29	16.3	1.1249	72	39.1	1.3635
30	16.8	1.1297	73	39.6	1.3699
31	17.4	1.1345	74	40.1	1.3764
32	17.9	1.1393	75	40.6	1.3829
33	18.5	1.1442	76	41.1	1.3894
34	19.0	1.1491	77	41.6	1.3959
35	19.6	1.1541	78	42.1	1.4025
36	20.1	1.1592	79	42.6	1.4092
37	20.7	1.1641	80	43.1	1.4158
38	21.2	1.1692	81	43.6	1.4226
39	21.8	1.1743	82	44.1	1.4293
40	22.3	1.1794	83	44.6	1.4361
41	22.9	1.1846	84	45.1	1.4430
42	23.4	1.1898	85	45.5	1.4498
43	23.9	1.1950	86	46.0	1.4568
44	24.5	1.2003	87	46.5	1.4637
45	25.0	1.2056	88	47.0	1.4707
46	25.6	1.2110	89	47.4	1.4778
47	26.1	1.2164	90	47.9	1.4848
48	26.6	1.2218	91	48.4	1.4920
49	27.2	1.2273	92	48.9	1.4991
50	27.7	1.2328	93	49.4	1.5063
51	28.2	1.2383	94	49.8	1.5136
52	28.8	1.2439	95	50.3	1.5209



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